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COMMUNICATIONS

SMOOTH MUSCLE OF THE PERIORBITA AND THE MECHANISM OF EXOPHTHALMOS

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DISCUSSION on the mechanism of exophthalmos is rendered unnecessarily difficult by doubt as to whether the experimental results obtained on the dog and other mammals may properly be expected in the case of human subjects. The work of MacCallum and Cornell (1904), Whitnall and Beattie (1933) and Code and Essex (1935) has shown that in the dog and cat exophthalmos may be produced by contraction of the periorbital membrane through stimulation of the cervical sympathetic nerve trunk at a point caudal to the superior cervical ganglion. To the smooth muscle of this membrane (or to the whole membrane) the name of "Müller's orbital muscle" has been applied (Müller 1858*a*, Whitnall 1932). The same name has also been given by the same writers to a muscle in the inferior orbital fissure in man. In Müller's article the muscles were said to be analogues. The human muscle has been illustrated by Whitnall. He points out that it cannot function like the muscle in lower animals owing to its different situation and size. The present writer has examined

the original works of Müller, Harling, Sappey and others as well as several text-books of animal anatomy but has been unable to find any illustrations of the minute anatomy of Müller's orbital muscle in the lower animals.

In this article histological preparations of the structure will be described and illustrated by photographs. Other photographs will show certain smooth muscle fibres which exist in the human periorbita. These were first described by D. S. Russell (1936) and, though less strongly developed, are similar in situation to Müller's orbital muscle of the lower animals.

Since Müller's article (1858*a*) is very short and rather inaccessible it seems worth while to give a complete translation of it.

" On the smooth muscle of the orbit in men and mammals."
" Preliminary communication by Heinrich Müller.

(1) " In man the inferior orbital fissure is filled with a greyish red mass. This consists of bundles of smooth muscle fibres which usually are equipped with elastic tendons.

(2) " In mammals there is a strongly developed muscular membrane connected with elastic laminae which is its more strongly developed analogue and which also consists of smooth muscle fibres (musculus orbitalis or membrana orbitalis of the author).

(3) " The third eyelid in mammals possesses in part smooth muscle continuous with the orbital muscle, in part striated muscle for drawing the lid forwards and backwards (the hare).

(4) " The orbital muscle is supplied with nerve bundles which consist almost entirely of fine or non-medullated (sympathetic) fibres. The nerves can be traced anatomically in part to the spheno-palatine ganglion.

(5) " The orbital muscle produces, by its contraction, the protrusion of the globe which has been observed in animals during the stimulation of the cervical sympathetic nerve. The same muscle acts as antagonist to the muscles which move the globe backwards in its cavity (M. retractor, orbicularis palpebrarum)."

Müller did not give any further details nor any illustrations of the orbital membrane. He died three years after the article was published. An obituary notice by Kölliker (1864) gives a list of his works.

Experimental Methods

It was decided to make sections through the whole orbital cavity of the cat and dog. The orbit was approached by removing most of the zygomatic arch and the coronoid process of the mandible. The muscles attached to them and to the ramus of the mandible

(temporalis, masseter, pterygoidei) were reflected downwards as far as possible (Fig. 3). Next a sagittal cut was made from the nose backwards in the middle line. To meet this a coronal cut was made through the maxilla and other bones in front of the orbit and a third cut was made parallel to the second but behind the orbit. The tissues were fixed in 4 per cent. formol saline and were decalcified with nitric acid. When decalcification was complete the mass was cut into blocks, usually with vertical faces at approximately right angles to the midline of the skull (coronal sections). The blocks were embedded in celloidin and sections were stained by haematoxylin and eosin, haematoxylin and van Gieson or by Mallory's phosphotungstic acid haematoxylin method. Sections were also prepared and stained by Weigert's elastic tissue stain.

Results

In the dog and cat only the medial wall, the anterior part of the floor and a small medial part of the roof of the orbit are formed by bone. The skull has an orbital fossa rather than an orbital cavity (Figs. 1 and 2). At the junction of the floor and medial wall of the orbit near the palato-orbito-sphenoidal suture, there is an almost horizontal antero-posterior ridge along which the periorbita is attached to the bone (Figs. 1 and 2). Above this ridge the skull is concave outwards, below it is convex outwards particularly in the dog. The lateral wall and the remaining part of the roof and floor are composed of periorbita (the periorbital membrane of H. Müller). This membrane is shown in Fig. 3. It resembles a hollow cone, having its apex attached to the bone round the optic foramen. Anteriorly it is attached to the lacrimal, frontal and zygomatic bones as well as to the fibrous orbital ligament which joins the two last-named bones. On dissection the membrane appears to be replaced medially by the periosteum of the frontal bone. Coronal microscopic sections suggest, however, that there is a layer of very loose areolar tissue between the fibro-muscular membrane and the true periosteum (see description of Fig. 6).

The orbital membrane of the dog includes three types of tissue: collagenous fibres, smooth muscle fibres and elastic fibres. The direction of all these fibres is mainly circular so that they are seen longitudinally in coronal sections of the orbit (Figs. 5-8). Elastic fibres, however, also run in other directions in several parts of the orbit and the amount of elastic tissue varies both absolutely and relatively to smooth muscle in different regions of the membrane.

DESCRIPTION OF FIGURES

All the figures except Figs. 5, 6 and 9 are untouched photographs. Figs. 5 and 6 are drawings based on photographs of sections. Fig. 9 is a sketch. The sections shown in Figs. 4, 7 and 8 were stained with haematoxylin and van Gieson; those shown in Figs. 10 and 11 with phosphotungstic acid haematoxylin.

Figures 7, 8, 10 and 11 are printed on art paper opposite page 264. The other figures appear in the text.

EXPLANATION OF FIGURES

ABBREVIATIONS

C.T.—Collagenous connective tissue.
E.T.—Elastic tissue.
G.Z.—Zygomatic (orbital) gland.
M.L.P.—Levator palpebrae superioris.
M.OB.INF.—Inferior oblique muscle.
M.OB.SUP.—Superior ,, ,,
M.R.B.—Retractor bulbi.
M.R.L.—Lateral rectus muscle.
M.R.M.—Medial ,, ,,
M.S.M. or M.SM.—Smooth muscle fibres.
N.O.—Optic nerve.
PAL.INF.—Lower eyelid.
PAL.SUP.—Upper eyelid.
P.INF.—Periorbita of floor.
P.LAT.— ,, of lateral wall.
P.MED.— ,, of medial ,,
P.SUP.— ,, of roof.
R.—Horizontal ridge of bone.
T.—Tear through loose areolar tissue.
TEC.OS.—Bony roof of orbit.
1.—Plane 1.
2.— ,, 2.
3.— ,, of Fig. 5.
5.—Region of Fig. 8

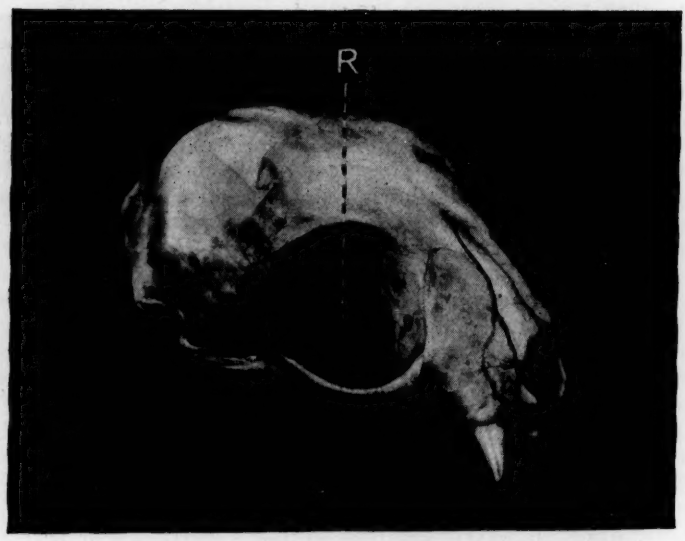

FIG. 1.

Skull of a cat to show the orbital fossa and the ridge (R) to which is attached the membranous part of the floor of the orbit.

FIG. 2.

Skull of a dog to show the ridge (R) as in Fig. 1.

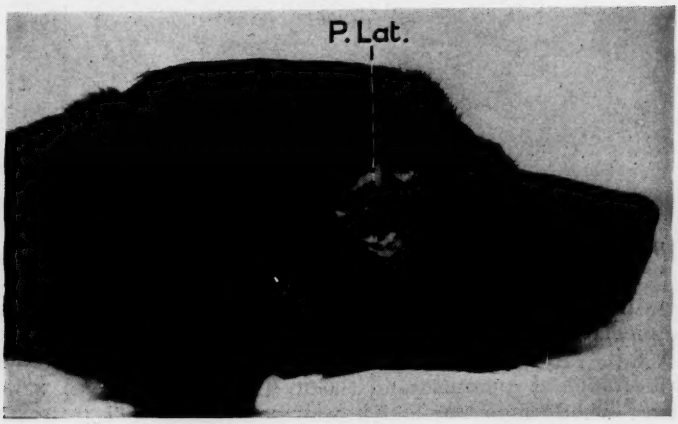

FIG. 3.

Dissection of the right orbit of a dog from the outer aspect to show the periorbital membrane (Müller's orbital muscle).

Coronal sections about 2 mms. behind the equator of the eyeball of the dog (Fig. 4, plane 1), show periorbita which is collagenous in the roof, fibro-muscular in the lateral wall, fibro-elastic in the floor and fibro-elastic in the lower 2 or 3 mms. of the medial wall. At the junction of the floor and medial wall it gives off a collagenous extension medialwards to the horizontal bony ridge. At the upper surface of the gland of the nictitating membrane the

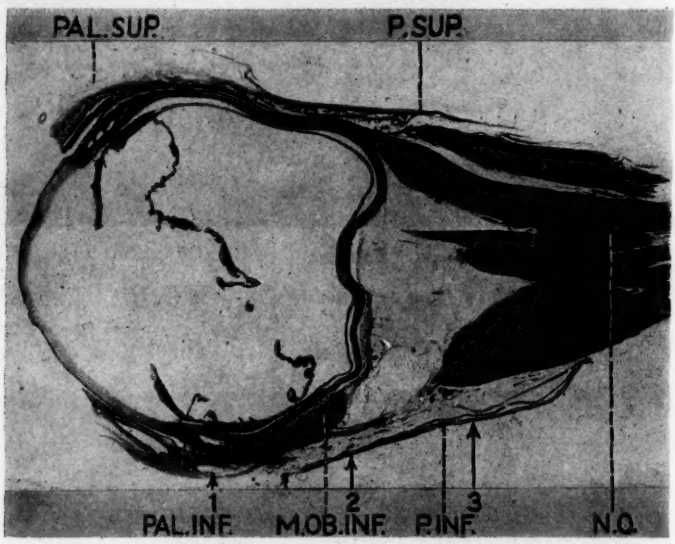

FIG. 4.

Antero-posterior section through the orbit of a dog. The posterior pole of the eyeball has come forward during fixation. Smooth muscle of the periorbital membrane at P.INF.

periorbita becomes collagenous and blends with the fine fibres on the medial surface of the nictitating membrane.

A little further back (Fig. 4, plane 2), the roof is collagenous with strands of muscular and elastic tissue. The lateral wall is almost wholly muscular and is well developed. The floor from without inwards is in turn musculo-elastic, muscular and elastic again. The medial wall is elastic in its lower two-thirds and collagenous in its upper third.

Behind the globe (Fig. 4, plane 3 and Fig. 5) the roof is muscular except near its medial attachment to bone where it is chiefly elastic. The floor is muscular except for some elastic fibres in

its middle third. The junction of the two tissues is shown in Fig. 7. The medial wall below the level of the optic nerve is muscular. Above that level it has an elastic portion which is attached to the bone. In the same coronal section a concentric band of smooth muscle is present between the superior oblique muscle and the rectus medialis muscle (shown in Fig. 8).

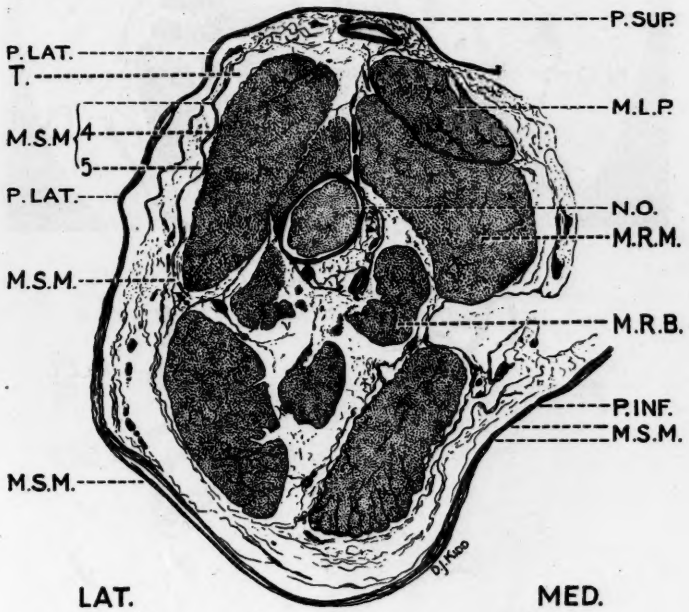

FIG. 5.

Coronal section through the orbit of a dog at about plane 3 of Fig. 4, to show smooth muscle (M.S.M.) in the periorbital membrane (see text). There is a tear along the pointer line to M.R.B.

In the case of the cat the periorbital roof in this plane is muscular (Fig. 6) as is also most of the lateral wall and the lateral part of the floor. The middle part of the floor is elastic, but smooth muscle is found in the medial part of the floor and in the medial wall. It is attached to the medial bony wall of the orbit by extremely fine and loose connective tissue.

The sections show that a considerable amount of fatty tissue is enclosed in the periorbita (Figs. 4 to 6). The zygomatic or

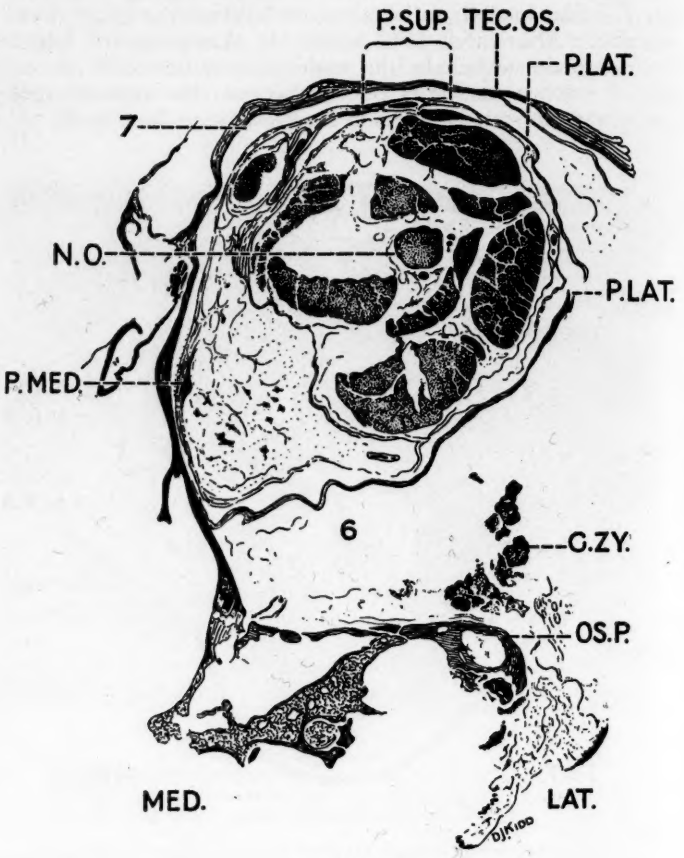

FIG. 6.

Coronal section through the orbit of a cat behind the globe of the eye. At 6 a portion of fine areolar tissue has fallen out of the section. At 7 the areolar tissue was so fine that it could only be photographed if the negative was exposed to such a degree that all other details were lost.

orbital salivary gland may be seen in Fig. 6. The lacrimal gland is inside the periorbita; the zygomatic gland is outside it. Investing fascia of the extrinsic muscles of the eye can be seen in Figs. 4 to 6. It can easily be distinguished from the smooth muscle of the orbital membrane in the histological sections.

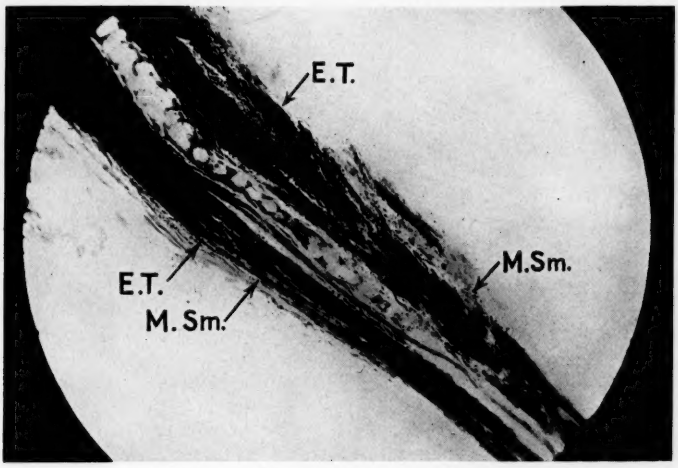

FIG. 7.

Region at left hand lower corner of Fig. 5 highly magnified to show junction of smooth muscle and elastic fibres.

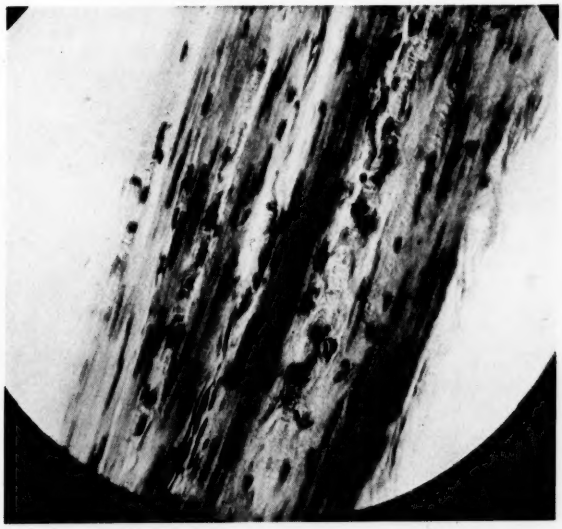

FIG. 8.

Region M.S.M. 5 of Fig. 5 more highly magnified, showing typical smooth muscle fibres.

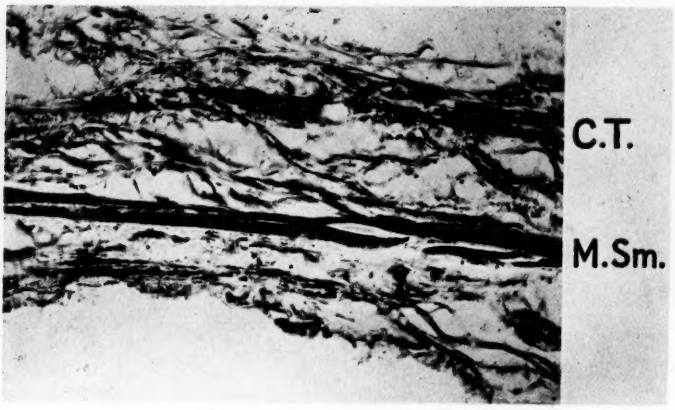

FIG. 10.

Human periorbita adjacent to the lateral rectus muscle, showing smooth muscle fibres as a dark band.

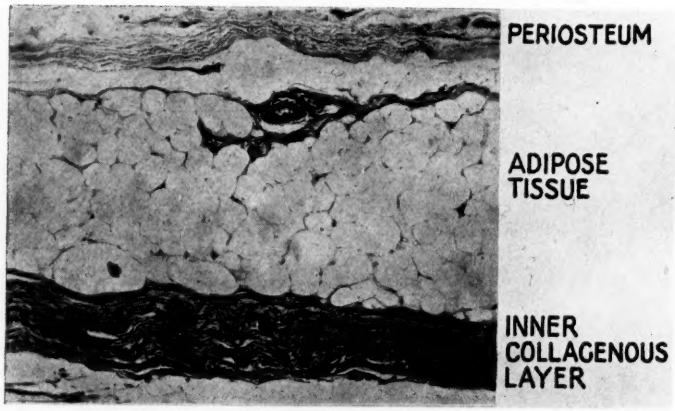

FIG. 11.

Human periorbita from the dorso-lateral angle, showing darkly staining smooth muscle fibres in the inner collagenous layer.

Discussion

MacCallum and Cornell (1904) exposed the periorbital membrane in dogs and observed its contraction on stimulation of the cervical sympathetic nerve trunk. They obtained a record of the protrusion of the globe. After the membrane had been divided, stimulation of the cervical sympathetic trunk no longer produced exophthalmos. The work of MacCallum and Cornell was confirmed and extended by Whitnall and Beattie (1933) and by Code and Essex (1935). The latter workers replaced the globe of the eye by a balloon and registered the increased pressure in the balloon when it was prevented from coming forward and the nerve was stimulated. They have also shown by a film (Code and Essex, 1936) that nervous excitation of the periorbital membrane produces a forward movement of the eyeball in the dog.

This proved immediate mechanism of proptosis in the lower animals has no obvious functional analogue in man. Müller himself (1858*a*) recognised that in animals the musculo-elastic membrane was " more strongly developed " than the muscle in the infra-orbital fissure which, unfortunately, shares with it the name of Müller's orbital muscle. Results obtained from lower animals cannot without care be applied to the immediate mechanism of proptosis in man. Indeed no mechanism suggested in man has so far been able to win general acceptance.

The present writer has tried to obtain and examine *post mortem* room specimens of orbits from " normal " human subjects as well as from patients suffering from Graves' disease (with or without exophthalmos) at the time of their death. Recently a series of such orbits has been described by D. S. Russell (1936). Dr. Russell has allowed the writer to examine the sections and to reproduce in this article Figs. 9, 10 and 11, none of which has been previously published though they have been demonstrated with the preparations from which they were made.

The series included six cases of Graves' disease and three normal controls. The specimens were prepared by chiselling away the roof of the orbit. To this the periorbita was only very lightly attached. It was exposed as a cone-shaped glistening membrane, closely enveloping the soft tissues of the orbit (Fig. 9). These tissues were then dissected away with the bony wall of the orbit, fixed, decalcified and embedded in paraffin. Coronal sections were made in planes 1 cm. and 2 to 3 cms. in front of the anterior end of the optic canal and were stained by various methods, of which Mallory's phosphotungstic acid haematoxylin method demonstrated the smooth muscle fibres most clearly. Weigert's resorcin fuchsin stain was used for elastic fibres.

Of the orbits examined only those from one of the patients who

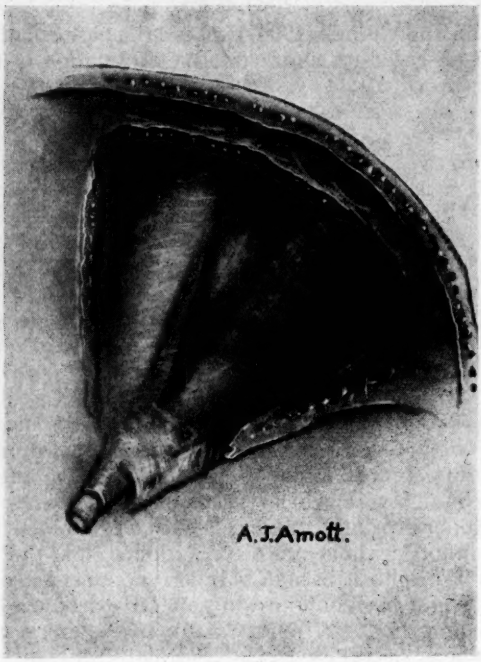

FIG. 9.

Periorbital membrane in a human subject, exposed by removal of the bony roof of the right orbit.

had Graves' disease at the time of death showed any pathological features. The oculomotor muscles in this case contained "Lymphorrhages" (Friedenwald 1932, Naffziger and Jones 1932). Otherwise the orbits of those who had Graves' disease including exophthalmos at the time of death did not differ from the normals. They showed no hypertrophy of striped or smooth muscle. In sections stained by Mallory's method unstriped muscle was visible in all the orbits. It extended throughout a large part of the periorbita in the planes of the sections and was most abundant on the lateral aspect (Fig. 10). Here the fibres were continuous with the smooth muscle of the inferior orbital fissure. They were situated towards the inner part of the orbital sheath. They became less numerous as the dorsal aspect of the periorbita was reached and few were found medial to the frontal nerve. On the floor of the orbit muscle fibres passed in the periorbita from the inferior orbital fissure towards the medial wall but did not reach it. Here

the periorbita was closely applied to the ethmoid bones and resembled periosteum. On the roof and lateral aspects, however, the periorbita could be divided into three layers:—(1) an outer collagenous layer or periosteum proper, (2) a middle adipose layer, and (3) an inner dense collagenous layer. In this last layer were situated the smooth muscle fibres (Fig. 11). They were associated with numerous coarse and fine elastic fibres. Less conspicuous elastic fibres were also present in other parts of the periorbita which were devoid of muscle.

Much histological work on the human orbit has been concentrated on the front of the cavity and the structures that are attached to the eyeball itself. This may explain why the smooth muscle fibres in the posterior region have not hitherto been described. The drawings made from microscopical preparations and described in Hesser's (1914) article show occasional muscle fibres. Hesser regarded these as unimportant. In 1865 Harling noticed that the periorbital smooth muscle of the dog was less developed than that of the sheep. He wondered whether it was present in sufficient quantity to have a function. His question has been answered affirmatively and unequivocally. The same question may be asked to-day about the still smaller amount of smooth muscle which D. S. Russell has found in the periorbita of man. It may even be that differences in the development of smooth muscle in the two orbits of a patient may explain the puzzle of unilateral exophthalmos following thyroid medication (Brain 1936 and others).

The nomenclature of the smooth muscle in these different situations deserves some consideration. Müller described the musculo-elastic membrane of the lower animals as a more strongly developed analogue of the muscle in the inferior orbital fissure in man. One must agree with Whitnall (1932) when he says that, owing to its situation, Müller's orbital muscle in man could not increase the pressure behind the globe of the eye or otherwise produce exophthalmos. So identity of name hides a difference of function. If Müller's alternative name of " orbital membrane " were reserved for the structure in the lower animals and the name " orbital muscle " for the muscle in the region of the inferior orbital fissure in man a distinction would be suggested. Further, if the smooth muscle described by D. S. Russell is shown to have an important function, it will perhaps be named after its discoverer or be described as smooth muscle of the posterior periorbita.

Summary

(1) The whole orbital region was removed in one piece from the heads of dogs and cats. After fixation, decalcification and celloidin embedding, sections were stained by different methods.

(2) Sections at various planes show how smooth muscle and elastic tissue join with collagenous fibres to form the periorbital membrane known as Müller's orbital membrane or muscle. This is a funnel-shaped structure, having its apex round the optic foramen and attached in front to the orbital margin. In planes behind the eyeball it contains much smooth muscle. Its contraction increases pressure behind the globe and forces the globe forward. Its relations to the investing fascia of the extrinsic muscles of the eye and to the secreting glands of the orbital region are considered.

(3) Müller's orbital muscle in the lower animals is the final mechanism in them for proptosis. Müller's orbital muscle in man cannot by itself produce proptosis.

(4) Photomicrographs show smooth muscle behind the eyeball in the upper and outer periorbita of human subjects whether normal or suffering from Graves' disease. This muscle may be the functional analogue of the periorbital membrane of the lower animals and be a mechanism for the production of exophthalmos in man.

(5) The nomenclature of the smooth muscle in different situations is discussed.

My thanks are due to Professor D. T. Harris, Professor H. M. Turnbull and Professor Roaf for their interest in the work, as well as to the Trustees of the Shennan Research Fund, London Hospital and the Research Grants Committee of the University of Liverpool who defrayed the cost of the work and its preparation for publication.

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A CORNEO-SCLERAL SUTURE IN CATARACT EXTRACTION. ITS TECHNIQUE AND ADVANTAGES

BY

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LONDON

THE use of a corneo-scleral suture in the operation for cataract extraction has been advocated in the past by a number of ophthalmic surgeons in different countries, and there are many modifications in the manner in which this suture is applied. The literature on this matter does not comment fully on the advantages to be gained by this addition to the technique of cataract surgery.

To date I have never seen it noted that a corneo-scleral suture properly applied is of considerable value in the prevention of post-operative hyphaema. In most cases this complication occurs about the 4th or 5th day after operation and the blood comes from the edge of the section wound, probably from opening of the wound and the tearing of the newly formed capillaries which traverse it.

In 107 consecutive cases of cataract extraction (79 extra-capsular and 28 intra-capsular) in which I have used a corneo-scleral suture in the manner described below there has been no post-operative hyphaema, whereas before using this stitch this complication was present in about 30-35 per cent. of the cataract extractions I did in the Moorfields Eye Hospital. This disparity is too remarkable to be explained on fortuitous grounds.

The corneo-scleral suture is particularly of value in elderly persons for whom immobilisation in bed for a few days may have adverse consequences. The patient may with safety be allowed out of bed into a chair on the day following operation. The stitch is probably a factor in the prevention of iris prolapse. In 2 of the series of 107 cases a narrow rim of iris was seen in the wound—24-48 hours after operation, in one case on the nasal side and in the other on the temporal. In both these cases I was conscious of the fact that I had not tied the corneo-scleral stitch with that degree of firmness which is proper, and in one the iris was flaccid and difficult to replace so that it was tempting providence not to have done an iridectomy.

In the extra-capsular operation I have generally left the eye without a peripheral iridectomy but have preferred to do this as a preliminary to intra-capsular extraction. Graves has pointed out the use that may be made of the scleral part of the suture for the purpose of fixation of the eye. This may be effected by holding

together in plane forceps the two ends of the scleral part of the suture 1 or 2 mm. from their point of passage through the sclera. This mode of fixation of the globe is particularly good in elderly patients whose conjunctiva is thin and atrophic and would tear quickly in the fixation forceps.

The corneo-scleral suture is of considerable value in cases where vitreous loss may be anticipated, on account of a degenerated state of this media, a highly myopic eye, and intra-capsular extraction. I think that it is the only surgical manoeuvre that will in any way check that relentless forward flow which occurs once the vitreous face has been broken. Stitches in the conjunctival flap are useless when this disaster occurs. No untoward consequences have occurred in the series of 107 cases in which this stitch has been used. Some transient striate keratitis in the vicinity of the stitch has been present in some cases, but this has never been so severe as in some cases of cataract extraction in which the stitch has not been used. It clears up in 8-10 days and leaves no permanent defect. There has been no case of corneal abscess or ulceration arising from the use of this suture.

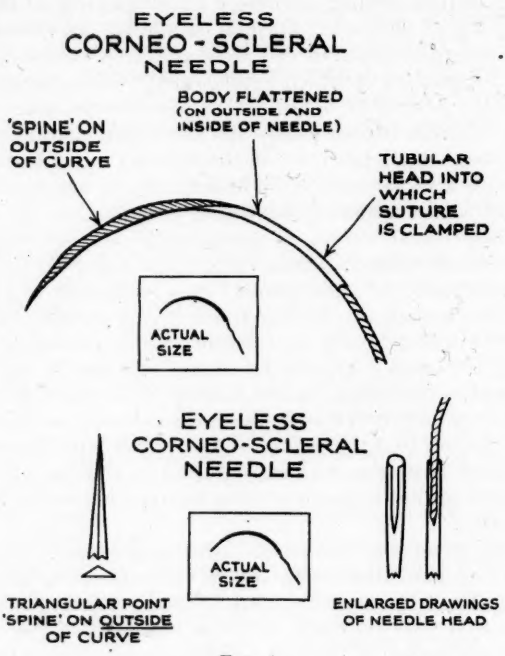

FIG. 1.

In most cases the astigmatism has varied between 1·25 and 2·25 D., in a very few cases it was 3 or 3·25 D., and in some there was no post-operative astigmatism at all.

Technique.—The needle and suture (2/0 black braided silk) were made for me by Merson Ltd., Edinburgh. The needle is 12 mm. long, the curve corresponds approximately to that of the Maddox needle but unlike this needle it is eyeless and the spine has a cutting edge on the convex or outer aspect of the needle (the spine of the Maddox needle is on its concave inner aspect) (see Fig. 1). It is held in a small Quarry Silcock's needle holder, the jaws of which are fined down.

Preliminary to insertion of the suture, akinesia of the orbicularis is produced, a stitch is passed through the skin of the upper lid 3 mm. from the centre of the lid margin, an Arruga's speculum (see Fig. 2) is inserted and a superior rectus stitch is hitched and

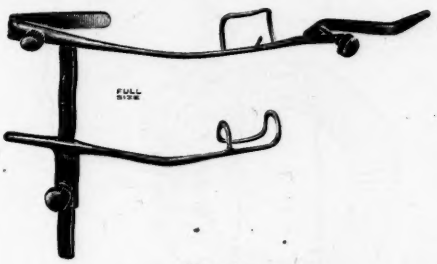

FIG. 2.

Arruga's Speculum (Down Bros., London).

tied over a small boss on the upper shank of the speculum. At this stage the upper shank of the speculum should not be racked up by the screws controlling the thin plates that rest on the bridge of the nose and the temporal region. If the upper shank of the speculum is thus lifted away from the globe a difficult angle is made for manipulating the needle holder when passing the corneo-scleral suture.

The globe is partly steadied and fixed by the superior rectus stitch but additional fixation is needed by forceps applied so as to grasp the insertion of the internal rectus and overlying conjunctiva when the stitch is passed through the right cornea and the external rectus in the case of the left eye, the fixation forceps being held in the left hand and the needle holder in the right when passing the suture in each eye.

When the eye is fixed the point of the needle is dipped into the anterior half of the substantia propria of the cornea at a point

1 mm. inside the limbus in the " 12 o'clock " meridian. The needle is made to traverse 2 to 2·5 mm. of the cornea in a transverse direction before emerging through the surface. The surgeon still maintains fixation of the globe whilst the needle is inserted in the holder with its point facing in the opposite direction to that in which it traversed the cornea.

The point of the needle is then passed through the conjunctival and subconjunctival tissues and engages in the superficial layers of the sclera 1·5 mm. above the limbus opposite the site at which the needle emerged from the cornea. It passes transversely through the superficial half of the sclera for 2·5 mm. and is brought out

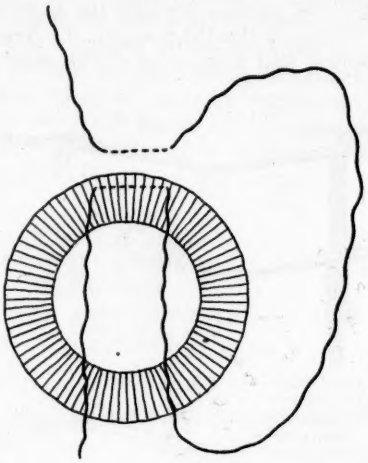

FIG. 3.

through the conjunctiva opposite its entry wound in the cornea. The suture is damped with sterile saline and the corneal ends of the stitch are then drawn downwards in the " 6 o'clock " meridian are placed over the cornea and the scleral ends are drawn upwards in the " 12 o'clock " meridian and laid on the conjunctiva (see Fig. 3).

The screws on Arruga's speculum are then adjusted so that the upper shank is held away from the eye and the weight of the speculum is borne on the bridge of the nose and the temporal region.

The corneo-scleral section is made and the Graefe knife cuts out between the corneal and scleral parts of the suture. It is generally possible to obtain a small frill of conjunctiva as a flap. The corneal ends of the suture are held in iris forceps and gently

drawn forwards so as to open the wound sufficiently to admit a pair of capsule forceps.

In the intra-capsular operation immediately the lens is delivered the scleral end of the suture is drawn through so that the edges of the section wound are closely and firmly coapted. The suture is then tied with two forceps. In the extra-capsular operation the scleral end of the suture should be drawn through, but 2-3 mm. of the loop should be allowed to remain slack so that the edges of the section wound may be separated enough to allow the introduction of a cannula for washing out the soft lens matter from the anterior chamber.

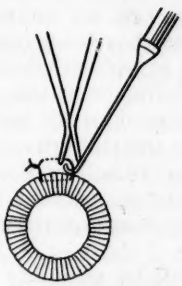

FIG. 4.

Care must be taken to see that the conjunctival frill is not turned into the section wound when the stitch is tied. The frill of conjunctiva is stroked into place with an iris repositor.

The stitch is removed on the 14th day after operation. Pantocain 1 per cent. is instilled and the upper lid held away from the globe with a Desmarres' retractor. The loop opposite the knot (see Fig. 4) is seized with straight plane iris forceps or lifted up very gently on a small hook and divided by de Wecker's scissors which have been ground down and have blunt ends. The knot is then seized with iris forceps and the suture withdrawn carefully and gently in the plane of its transverse course.

Summary.—The advantages of a corneo-scleral suture in the operation of cataract extraction, both intra-capsular and extra-capsular, are discussed. This suture is particularly of value in the prevention of post-operative hyphaema. In a series of 107 cases (79 extra-capsular and 28 intra-capsular) this complication did not occur at all.

The needle employed and the technique of inserting the suture are described.

INTRA-CAPSULAR EXPRESSION OF CATARACT

BY

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MADRAS

Introduction

To the ophthalmologist all the world over the operative treatment of cataract is a subject of never-ceasing interest. In the East, and particularly in India, it forms, to many surgeons, qualified and unqualified, specialist and not, all or most of ophthalmology. Much has been, and will continue to be, written on the subject so long as it retains a place in ophthalmic surgery. The observations set down by the contributor of this article have been made independently by him, but he does not lay claim to anything new. He well remembers seeing the collection of accouchement instruments excavated from the ruins of Pompeii which strikingly resemble those in use to-day. It would seem that the trite saying, " There is nothing new under the Sun," is none the less true.

He was greatly impressed by watching the work of Col. Smith at Amritsar in 1920. In 1930 when he began work as an eye-specialist at Madura he intended to work on the lines of Smith. But, not having a trained staff nor control over it, had to give up intra-capsular extraction and fall back on the capsulotomy operation. Towards the middle of 1932 so many cases returned for needling that it became a matter of serious concern to avoid a second operation and he decided to try the intra-capsular method again. By this time the staff had come under his direction. From then on he has almost exclusively performed intra-capsular extraction. It would be better, perhaps, to say " Expression," because the lens is made to come out by graduated pressure.

The method adopted by the writer, however, differs so greatly from that of Smith that it would be better to set down the details.

Smith's Operation

Smith's operation in brief:—Corneal section, full and fairly wide iridectomy and expression of the lens. Smith used to say that a brisk reacting pupil was sufficient indication of a healthy retina behind and he used to carry out no further test, but simply take the cases on to the operating table as they came from their homes.

The writer has followed the orthodox methods of preliminary observation, investigation and treatment of the cases as far as practicable within the limitations of the institution in which he worked. He has noticed in some cases showing a quick reaction of the pupil to light, that the projection was poor and consequently the result of operation unsatisfactory.

Author's Operation

The present writer's method:—The lacrymal passages are tested for patency and syringed out the day previous to the operation. Eyebrows are shaved and eyelashes cut; a clean shave of the face also whenever necessary.

Anaesthesia.—In practically all the cases pantocain was the anaesthetic used; a 1 in 200 solution for instillation, 1 in 500 for the facial block and 1 in 400 for the ciliary block. The anaesthesia was almost invariably successful.

Details of the Operation.—1½ to 2 hours previously the eye is washed out with 1:3000 corrosive sublimate lotion and a drop of 2 per cent. homatropine and cocaine solution instilled. The face is then painted with tincture of iodine or picric acid. At operation, four instillations of the anaesthetic solution are made at two minute intervals, a drop of fresh 1 in 1000 adrenalin being instilled along with the anaesthetic at the second and third instillations. The facial nerve is blocked at the neck of the mandible and the ciliary block done through the lid at the infero-temporal angle of the orbit. The eye is then well washed out with sterilised normal saline. Speculum is introduced and section, a little smaller than hemi-, is made through the corneo-scleral junction and a conjunctival flap is formed. The flap is turned down on the cornea. The assistant then raises the speculum off the globe. The iris is seized close to its root with straight iris forceps and a small knuckle of iris is gently brought out of the wound and a radial incision is made to one side of the tip of the forceps. The iris is then carefully replaced.

FIG. 1.

To illustrate the stroking movement.

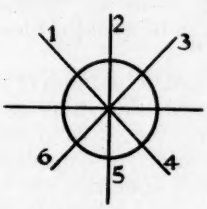


FIG. 2.

The various "presentations."

With the strabismus hook placed on the lower part of the cornea gentle pressure is exerted towards the lower pole of the lens and at the same time the bend of the hook is stroked to and fro along the lower limbus. Under this combined pressure and kneading movement the zonule gives way at its weakest spot, which differs in different eyes. The writer has noticed it giving way at any of the 6 points shown in the diagram, as evidenced by the lens beginning to bulge out at the spot. The stroking part of the manoeuvre is now stopped and the pressure alone is continued. The lens slowly expands the pupil and comes out through it and then out of the section. In the positions above the horizontal diameter it comes out straight and in those below as a "tumbler." Depending on the consistency of the lens it takes on a characteristic

FIG. 3.

Lens moulding. Interrupted line shows outline of un-moulded lens.

moulding as does the foetal head coming out of the pelvis. The iris usually remains in place after the delivery of the lens because of the contraction of the pupil. If not it is carefully replaced. The conjunctival flap is stroked back into position, a drop of eserine or atropine solution instilled and a small quantity of a carefully sterilised ointment of the same is introduced to glue the lid margins together and the two eyes are bandaged.

The bandage is opened on the third morning and the eye is examined. If everything is satisfactory the operated eye alone is bandaged. Dressings are discarded on the eighth day.

This is a brief description of the operation. The complications at and after the operation are the usual ones described in text-books and need not detain us. Sometimes haemorrhage from an internal pterygium can be avoided by making the section oblique temporalwards.

Prolapse and actual loss of vitreous are the complications which have been the objections against this type of operation. The writer believes that if what follows is carefully studied these complications will not be considered so formidable.

As in every operation the suitability of the case for operative treatment is a great point. Firstly cataracts, from the operative point of view, can be classed into immature, mature and hypermature. The pros and cons of the advisability of operating on

immature cataracts need not be entered into here. Each case has to be decided on its merits. For the type of operation described in this article the cataract that is just mature is the best suited. For, it is in this that the cortex is soft and capable of the degree of moulding that is required of it to come successfully out of the pupil and then the section. The immature, on account of the healthy lens fibres still present, is too tough easily to mould itself.

Of the hypermature the black type is very difficult to deliver because it is all nucleus and does not mould well. But the other, the Morgagnian, is far and away the most difficult of all for this type of operation. In the report of the Madras Government Ophthalmic Hospital for the year 1931 it is stated: " it (intra-

FIG. 4

Nucleus of Morgagnian cataract lying across section.

capsular operation) is eminently suitable for Morgagnian cataract." In the writer's experience it is not so. The nucleus of the Morgagnian cataract, in the operation described above, behaves like the after-coming head in a breech case. The bag of fluid easily pushes its way through the pupil and is followed by the nucleus because it is a round aperture; but the fluid makes the section only just gape and passes through and the after-coming nucleus hitches against the sides of the slit like the base of a collar stud below the button-hole, and makes it extremely hard to get it out. This has occurred many a time in the writer's experience. In one case the lens executed a triple somersault in the anterior chamber before coming out of the eye.

Secondly, the appearance of the eye itself on completion of the section is an indication of its suitability or otherwise. The writer has observed that the eye behaves in one of three ways; there are those in which the cornea collapses backwards; there is a second class in which the cornea retains its shape and the irido-lenticular diaphragm remains in its normal position; and there

is the third group in which the cornea not only retains its shape but the irido-lenticular diaphragm moves forward. If this phenomenon is not manifest immediately the knife is out of the section it becomes so on the assistant raising the speculum.

This no doubt indicates the tissue tension and the tension of the eye-ball. But it has got the greatest bearing on the operation. The first two classes are the ones in which an intra-capsular operation can be done with perfect safety by anybody. The last is the class in which sometimes, even with capsulotomy, escape of vitreous occurs. That is, perhaps, the reason why this complication finds its mention even in books which advocate only the capsulotomy operation.

Even in this class of eyes intra-capsular operation can be attempted by one alive to the possibility of vitreous trouble. If a careful watch is kept on the emerging rim of the lens and a black bead is noticed behind the rim of the lens, pressure of the hook is immediately slackened, a vectis passed behind the lens and a quick delivery effected, there can be no loss of vitreous. At the most there is a tiny amount clinging to the ring of the vectis. The iris being entire keeps the vitreous effectively back from the section.

Complicated cataracts, in the accepted sense, are treated according to the conditions obtaining in the individual case. But there are two types which may be noted here. There is the cataract developing in an eye which has previously had a trephining done for chronic glaucoma. It has been the writer's experience that trephining is a very unsatisfactory operation from the point of view of a later cataract extraction. The larger opening made for the latter acts much more effectively for filtration, during the days immediately following the operation and so the filtering scar closes up. At the end of the week the section also is healed and when the bandage is discarded it is found that little vision is left in the eye. This has happened several times in the writer's practice. With an iridencleisis this does not appear to occur; but the writer's experience is not large. He has had only one case, in which the iridencleisis was performed at another hospital and cataract was successfully removed by him through a section placed a little anterior to the iris inclusion with good results.

When cataract develops in an eye which has a congenital coloboma, infero-nasal, the usual position, whatever the method of operation it is very difficult to bring the lens out and the result of operation is disappointing. The writer has had two cases of this kind in his practice. Operation was undertaken because this was the only functioning eye before the development of cataract and curiously enough both were left eyes. In the first the usual section was made. The lens nucleus moved up and remained

hitched against the upper lip of the section and was removed with the vectis under the most difficult conditions. Thinking that the defect in the zonule below was the cause of this difficulty the section was made below in the second case. It did not in any way facilitate extraction.

This article has been written to invite the attention of ophthalmic surgeons to a type of the intra-capsular operation which may be adopted more universally. If suitability and the behaviour of the eye on section are well weighed and the operation conducted with ordinary care and patience the results are almost uniformly good. A large proportion of the writer's cases have been discharged with perfectly round jet-black pupils, like those of babies.

In the Madras Report referred to above Wright derides the " boat-shaped " pupil that is said, sometimes, to result after this operation. But such a pupil is seen only if there is a loss of vitreous and some incarceration has taken place in the section. If the pressure is modulated and time is allowed for the lens to mould through the pupil this does not occur. Pulling out the lens by a forceps gripping its anterior capsule or an erisiphake clinging to it is in the nature of a " vis à fronte," lifting the lens bodily at once from the fossa patellaris, with the creation of a potential vacuum in the latter which can only be filled by a displacement of the vitreous. In these a boat-shaped pupil is more likely to result.

With an uncut iris the difficulty is to overcome the sphincter and the all-important factor here is a modulated steady pressure. One is often tempted to release the presenting rim of the lens from the grip of the pupil, as this is the stage at which delay occurs, by counter-pressure with an iris repositor. But this is undesirable and will lead to distortion of the pupil. In fact the use of two instruments for the delivery of the lens except in case of vectis delivery is simply inviting disaster. The time taken to overcome the pupillary sphincter varies in different cases, being just a few seconds in some and many minutes in others.

Another objection to this kind of operation is the likelihood of opacity of the cornea developing as a result of the pressure of the hook. Unless the epithelium of the cornea is denuded by a too free use of cocaine this does not occur. When it takes time for the lens to mould all that is necessary to prevent injury to the cornea is to keep it moist with normal saline lotion.

Out of an experience of more than 1,500 cataract operations the number under review is 629. The tables which follow give details culled from the case sheets of all the cases from the time of commencement of this type of operation at the end of June, 1932, to the end of 1933. The cases have not been specially selected;

"the fat and the lean" are all included. Owing to the practice, subsequently changed, of noting visions on outpatient tickets, which are not now available to the writer, on the discharge of the patients from the wards, 289 case sheets do not show a record of vision after operation.

As regards vision it should be remembered that almost all the cases operated on belong to the South Indian villager class, a class proverbially ill-nourished and half-starved, lacking the articles of diet containing vitamins from year end to year end. It is worth mentioning here that many students drawn from this class have attended the clinic for defective vision in whom an exhaustive examination had failed to reveal any error of refraction or other abnormality whose vision improved on the administration of cod liver oil. In the relatively small number of better class cases operated on at hospital and in private cases the vision with correction has been 6/6 or better and Jaeger 1.

Secondly, many have such a rooted objection to wearing glasses that they refuse the free gift of suitable correction at Government expense, simply expressing contentment at the "lifting of the curtain before their eyes" as they quaintly put it.

TABLE I

Total	Immature*	Mature	Black	Morgagnian	Complicated
629	109	462	1	36	21

* Vision ranging from fingers close to the face to less than half metre in most, only a few counting fingers beyond half metre.
NOTE.—28 were "Tumblers" including 9 Morgagnians.

TABLE II

Total	V. recorded	V. not recorded	Sepsis	Internal Haemorrhage	Died
629	331	289	4	2	3

TABLE III

Vectis delivery	Vitreous threatened and receded	Vitreous loss		Lens sank back
		Vectis	No vectis	
47	12	14	20	1

TABLE IV

	Total	Vitreous loss*
Intra-capsular including vectis delivery -	580	32
Capsulotomy - - -	49	2

* No attempt has been made to classify into "One bead," etc., as the writer believes the seriousness is the same whether the loss is small or great.

TABLE V

Prolapse Ratio

	Simple	Iris slit	Buttonhole iridectomy	Full iridectomy
Total of each -	20	373	18	218
No. of prolapses -	1	15	0	6

TABLE VI

Vision uncorrected

Nature of operation	V = 0*	V = F. below ½ m.	V = F. ½ to 1 m.	V = F. 1½—2 m.	V = F. over 2 m.	
Capsulotomy -	3	8	12	1	0	49
Capsule burst -	1	3	10	0	0	33
Intra-capsular -	1	40	184	17	1	547
Vectis delivery -	1	4	15	0	0	
Vitreous loss -	4	3	10	0	0	
Complicated -	12	0	0	0	0	
Lens sank back -	0	1	0	0	0	

* Includes perception of light and hand movements also.

Summary

1. Intra-capsular expression of cataract of the type described above is a safe and simple operation and gives excellent results.

2. Suitability of the case depends on the degree of maturity of the cataract and the behaviour of the eye on section, the first two groups being the most suitable.

3. It reduces intra-ocular instrumentation to the lowest and does not require elaborate and costly apparatus.

4. It avoids the risks of a second operation.

5. Bad results like " boat-shaped " pupil can be avoided by taking as much time as necessary for the moulding of the lens to occur.

6. Traumatic opacification of the cornea does not occur if cocaine is not used too freely and the cornea is kept moist.

7. It reduces the period of hospitalisation. Patients can be discharged from the hospital at the end of a week and in many cases all the reaction of the operation subsides in a fortnight and the eye is white.

TRANSPLANTATIO CONCHAE AURICULAE AS A NEW METHOD OF CORRECTING SPASTIC ENTROPION OF THE UPPER LID FOLLOWING TOTAL TARSECTOMY*

BY

N. I. SHIMKIN

HAIFA, PALESTINE

IN 1928, at a sitting of the Ophthalmic Section of the International Congress of Tropical Medicine and Hygiene in Cairo, Egypt, I read a paper entitled " Three cases of Spastic Entropion post tarsectomia totalis of the upper lid, cured by Homoplastica tarsi " (published also in *Klin. Monatsbl. f. Augenheilk.*, Maerz, 1929, S.360-364). I had the opportunity of observing the cases from six to seven years after the operation. In all cases the lid had kept its normal position so that the proposed method of homoplastica tarsi in spastic entropion post tarsectomia totalis has affected its purpose.

But the method " homoplastica tarsi " in suitable cases of spastic entropion has the disadvantage that there is not always material suitable for plastic operation available. When there is a patient with spastic entropion following total tarsectomy, there may be no patient needing tarsectomy whose tarsus could be used for transplantation, and vice versa.

In order to overcome this inconvenience, I decided to make use of the concha auriculae, as a plastic material. The fact that the auricular cartilage is a good plastic material, is mentioned in all manuals of ophthalmic surgery. Buedlinger and Muller's operation for correcting the defects of the eye lid by means of auricular cartilage, has come into general use.

* Paper read on December 10, 1937, in the Assembly of Delegates at the International Organisation against Trachoma. Fifteenth Congress of Ophthalmology, Cairo, Egypt.

But I did not succeed in finding in any, even the most comprehensive manual of ophthalmic surgery, any indication of the method of correcting spastic entropion of the upper lid resulting from total tarsectomy by means of substituting a graft of conchae auriculae for the tarsus of the lid.

I have observed only five new cases of spastic entropion after total tarsectomy during the past eight years. Possibly such cases are met with more frequently in trachomatous countries where the combined Kuhnt-Heisrath excision is often applied with an unsuccessful result. Several authors fearing entropion of the lid after the usual tarsectomy suggest after the removal of the trachomatous tarsus to replace it immediately with cartilage cut out of the helix of the ear. (Dr. Goldfeder, Ein neuer Weg den Eintritt eventueller Liddeformitaeten nach der einfachen Tarsusausschälung vorzubeugen. *Klin. Monatsbl. f. Augenheilk.*, April, 1931, p. 460.)

I now suggest my operation of the transplantation of the concha auriculae for the correction of the already existing spastic entropion after total tarsectomy and not for preventing it in the frequent and straightforward operation of simple tarsectomy. If the sutures, proposed by me as far back as 1913 at the first Conference of Russian Oculists at Moscow, are inserted correctly, and the bulbar conjunctiva is separated deeply enough, there is never an entropion following the combined Kuhnt-Heisrath tarsus excision. (N. Shimkin, Modification of sutures in the Heisrath operation, *Westnic. Ophthal.*, 1914, No. 6, p. 514-523.)

But though rare, precisely those cases of spastic post operative entropion demand the surgeon's particular attention, as such patients apply to the specialist after all the usual methods of operation for the treatment of entropion have already been tried and failed.

On examining the eyes of the above-mentioned patients, we find usually a linear scar on the skin of the lid, 3-4 mm. from the border along all its length from the outer to the inner canthus. This scar is the evidence of a former operation for correcting entropion according to the methods of Snellen, Hotz-Agnostakis, Panes and others. Secondly, canthotomy and 3rd grafting of mucous membrane into the lid according to van Millingen's method has also been performed. Only a narrow strip of tarsus, ½-1 mm. wide, is seen on everting the lid.

The clinical picture presented by all patients was as follows:— A severe blepharospasm, a complete entropion of the lid border up to 180° inwards. On drawing by finger the skin of the upper lid upwards, the entropion disappeared, and a pannus ulcerosus of differing degree was observed on the cornea.

The anatomical reasons for this severe entropion are the following:—

(1) A nearly complete absence of the tarsus of the lid as a consequence of its removal.

(2) Absence of tangential stretching of the lids by means of the fibres of the tarso-orbital fascia, levator palpebrae which is normally fixed to the upper border of the removed tarsus.

(3) Overaction of the musculi palpebralis et subtarsalis (Riolani) in the radial direction, owing to the loss of the antagonistic action of levator palpebrae and fascia tarso-orbitalis.

The concha auriculae is eminently suitable for this purpose of restoring the lid's integrity. The operation of restoring the lid's integrity by means of grafting concha auriculae in the place of the tarsus, previously removed by a Kuhnt-Heisrath excision, is performed in the following way and using the following instruments.

Instruments required.—Jaeger's spatula, a scalpel, sharp-pointed scissors, three silk sutures with one needle at each end, eight silk sutures with one needle each, needle-holder, forceps and a 2 c.c. syringe.

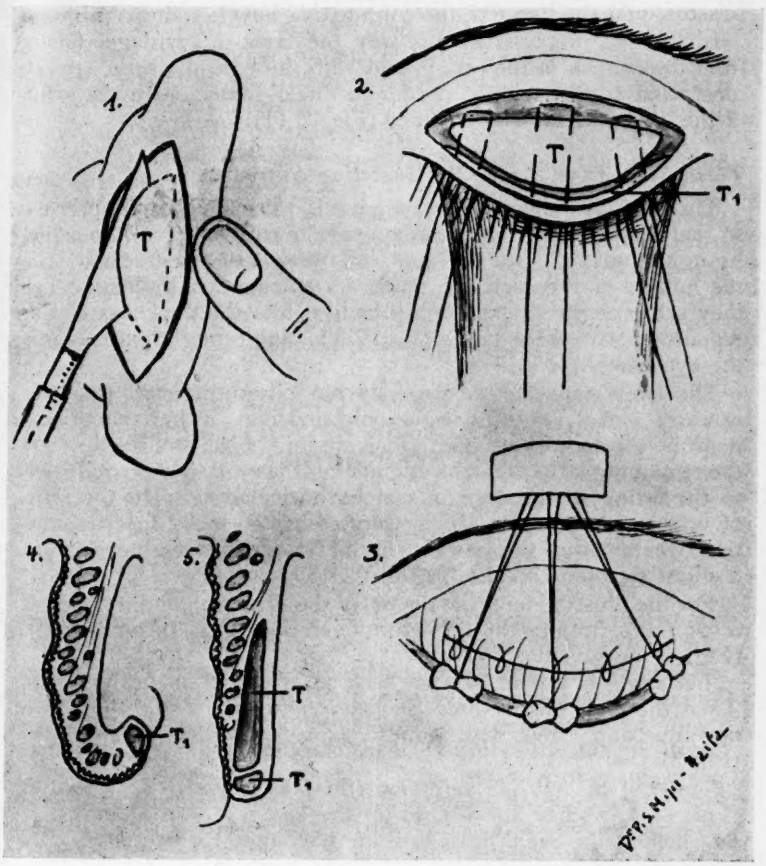
The operation consists of three steps.

First Step (Fig. 1). *Excision of the graft from the concha auriculae, its size being equal to that of the lid tarsus, formerly removed.*

The pinna of the ear is bent forward by the fingers on to the face, 1 c.c. of 2 per cent. novocaine + adrenalin is injected into the skin of the concha. Then a linear incision, 2 cm. long, is made in the skin of the middle of the concha. The skin of the middle of the concha is movable and separated off easily inwards and outwards, $\frac{3}{4}$ cm. each way. As the skin should be separated superficially, care should be taken not to touch the epichondrium of the concha auriculae. Cartilage 2 cm. in length and $1\frac{1}{2}$ cm. in breadth having been exposed, the border of the cartilage to be excised is outlined with a knife (Fig. 1 T). Then, out of the cartilage, a layer of about $\frac{3}{4}$ mm. thickness is excised by a scalpel laid flat with a sawlike movement. If the scalpel is held flat, the concha is never cut through. The prepared cartilage layer with its epichondrial tissue remains temporarily in its place, and is again covered with skin until the bed in the lid has been prepared.

Second Step (Fig. 2). *Preparation of a Bed for the Cartilage.*

1 c.c. of novocaine 2 per cent. + adrenalin is injected subcutaneously into the upper lid; the same, under the conjunctiva of the fornix. Then Jaeger's spatula is introduced under the lid.



Four or five mm. away from the lid border, an incision is made in the skin from the outer to the inner canthus of the lid; the skin being cautiously separated upwards and downwards. It should be borne in mind that in all cases the skin is always scarred and attached to the underlying tissue as a result of previous operations. The skin should be separated off down to the limit of the lid margin with scrupulous care, so that the base of eyelashes may be seen. The traces of the musculus ciliaris Riolani on the remainder of the tarsus are cut away with scissors, so that a narrow strip of the tarsus which has remained, becomes visible

(Fig. 2 T1). All the scar tissue in the wound is removed with scissors, and the tissue of the conjunctiva now becomes visible.

In the bed prepared in this way the layer of cartilage, taken from the concha of the ear, is laid with the epichondrium uppermost, and with the lower border in direct contact with the strip of the tarsus which has remained (Fig. 2 T1).

Third Step (Figs. 2 and 3). *Inserting Sutures.*

Three Snellen's loop sutures are used. The needles are inserted so that the loop lies on the tissue over the cartilage. The needles brought out of the tissue are inserted superficially in the middle of the cartilage under its epichondrium (Fig. 2 T); they are brought out and again pierced into the thickness of the remaining strip of the tarsus (Fig. 2 T1), and brought out between the eyelashes.

The loops over the cartilage do not allow the graft to move upwards and the sutures in the epichondrium further immobilise it, when the sutures are tied. The passing of the sutures through the remaining strip of tarsus and among the eyelashes is conducive to the fitting of the edge of concha auriculae close to the strip of tarsus. As soon as all the sutures are correctly inserted and tied over a cotton wool swab, the lid border is straightened, and a slight ectropion results (Fig 3).

For the illustration of the details of the operation and its results, a sagittal section of the lid before operation (Fig. 4), and after it (Fig. 5) are given.

The edges of the incision are sewn up with five surgical sutures. Then the ends of the three Snellen's sutures are slightly drawn upwards and fixed with adhesive plaster above the eyebrow (Fig 3).

Toilet of the eyelid: xeroform ointment is inserted. Two or three sutures close the wound on the ear. A sterile tampon is laid behind the ear. Both eyes are bandaged for two days.

Post-operative period.

Two days after the operation, the bandage is taken off and a sterile pad is worn for two days more. On the fifth day after the operation the sutures are taken out of the lid and ear, a bandage is applied for one day more, and the patient returns home.

After the first bandage, the patient feels better, the pannus diminishes, the ulcers gradually disappear, and the patient usually asserts that he sees better with the other eye too.

The simplicity of the operation and its consistently good results, have emboldened me to draw the attention of eye surgeons to this method of correcting severe cases of spastic entropion following total tarsectomy.

Summary

The author offers a new method of operation for correcting severe cases of spastic entropion following total tarsectomy. The method consists in a cartilage of corresponding size being taken out of the concha auriculae and laid in the bed prepared in the lid, to replace the tarsus removed by total tarsectomy. The operation consists of three steps described in the text and illustrated in the attached Table.

The author has operated in the above manner on five cases with consistently good results. The patients have been demonstrated before the Haifa Society of Oculists and the Jewish Medical Society in Haifa.

ANTEPOSITIO CONJUNCTIVAE FORNICIS. OPERATION IN SEVERE CASES OF SPRING CATARRH*

BY

N. I. SHIMKIN

HAIFA, PALESTINE

IN Palestine, as well as in Egypt, spring catarrh occurs the whole year round, *i.e.*, both during the cold and hot time of the year. But in the hot season, the clinical diagnosis of spring catarrh is not always easy, owing to the presence of trachoma and acute seasonal conjunctivitis in different forms. An immediate clinical determination of the diagnosis becomes especially difficult with the papillary form of trachoma. The exact setting up of a differential diagnosis among the trachoma highly spread in Palestine and the comparatively rare cases of spring catarrh, is possible only after curing acute conjunctivitis, the aetiology and epidemiology of which in Palestine have been expounded by me in a whole series of other articles (Shimkin, Harefua (Hebrew), 1923. *Ann. d'Ocul.*, 1924. *Brit. Jl. of Ophthal.*, 1926. Compte Rendu de Congrès International à Caire, 1931. Tome III).

While according to the data of various authors, up to 65 per cent. of the Arabic population in Palestine is affected with trachoma, and in the South of Palestine, in the villages, even up to 95 per cent., there are no more or less comprehensive statistics of the frequency of spring catarrh in Palestine.

* Paper read on December 9, 1937, at the Fifteenth Concilium Ophthalmologicum in Cairo, Egypt

The statistics of the number of out-patients in my clinic do not throw much light on this question, as the Arabic population applies to an ophthalmologist for special aid only in most difficult cases of spring catarrh, when itching, epiphora, photophobia, and sometimes blepharospasm deprive the patient of the possibility of working.

On examining such patients, one can see that papillae, hard as glass, densely cover all the conjunctiva of the tarsi up to the extreme border of the lids. Sometimes these papillae have grown so violently that they turn out up to the intermarginal line, forming such a thick layer of conjunctiva that it is 2-3 times thicker than the tarsus lying under it.

This abnormal thickening of conjunctiva at the lid border is common in spring catarrh, and may serve as one of the pathognomonic symptoms for differential diagnosis between spring catarrh and trachoma, but only after an acute conjunctivitis has been cured. Up till now little attention has been paid to this symptom. The normal lid border consists of three layers:—(1) skin, (2) intermarginal space, and (3) a tarsus with the thinnest of conjunctiva not seen by the naked eye.

In spring catarrh this free edge of the lid border consists of four layers:— (1) skin, (2) intermarginal space, (3) tarsus, and (4) a thick conjunctiva, the thickness of which is 2-3 times greater than that of the lid-tarsus. The presence of such a thick conjunctiva should always suggest to the physician its true cause, namely, spring catarrh.

The Arabic population, peasants and workers, consult an oculist expecting quick medical aid and relief; but spring catarrh is among those diseases of the conjunctiva in which medicamental therapy may bring forth a temporary relief but not healing. Hopes laid upon radiotherapy have only partly come true, for curing slight and medium stages of spring catarrh, but in severe forms of spring catarrh radiotherapy has proved ineffectual (Stallard,[1] Wilson,[2] El Tobgy[3]).

The operative treatment in severe cases of spring catarrh recommended by all manuals, consists either in excising the papillae on the conjunctiva of the tarsus or in their thermo- or galvano- or diathermo-cauterisation. As a palliative means, this operative interference alleviates the most unpleasant symptoms of the patient for a very short time; but the papillae on the conjunctiva of the tarsus soon grow again, and the patient returns to the doctor with the same complaints as before.

Axenfeld suggests partial tarsectomy, in which operation both

(1) Radiant Energy, *Brit. Jl. Ophthal.* (2) Annual Report, Giza Memorial Ophthalmic Laboratory, 1930 and 1933. (3) *Folia Ophthal. Orientalia*, 1933.

a part of the affected conjunctiva and the tarsus lying under it are removed.

But in severe forms of spring catarrh, all the conjunctiva of the tarsi up to the very lid border is affected; therefore, a partial tarsectomy brings little benefit in those cases, as the papillae remaining on the tarsal conjunctiva bring forth the same hard manifestations of itching, burning, lacrimation and photophobia. The combined Kuhnt-Heisrath tarsus excision, in which all the tarsus with the conjunctiva is removed 2 mms. down from the lid border, gives good results and very quickly frees the patient from sore sensations caused by this condition. But sometimes the papillae on the narrow part of the tarsus left, even when removed with a knife, during the operation, grow again and cause the same painful sensations, considerably lighter, however, than before.

But the application of combined Kuhnt-Heisrath excision for the therapy of spring catarrh is not justified either by the clinical or pathological picture of the disease.

On clinical examination of the excised portion of the lid tarsus, with the adjoining conjunctiva, the normal unthickened tarsus and the highly thickened tarsal conjunctiva attract the surgeon's attention.

The pathological researches of many authors have proved that in spring catarrh the tarsus with the Meibomian glands and their excretory ducts are fairly normal. As to the substance of the pathological process in the conjunctiva tarsi, it is seen that "the papillae of the conjunctiva tarsi originate owing to the growth and later hyaline degeneration of the subconjunctival tissue. Especially under the epithelium there is such a hyaline layer present, which gives the bluish-white appearance" (E. Fuchs, Handbuch f. Augenheilk.).

But if the lid tarsus in spring catarrh is normal, why should it be excised? If the *locus morbi* is only in the tarsal conjunctiva and subconjunctival tissue, then it is natural to remove only the affected tissue, and to cover the defect produced with a healthy conjunctiva. If there is enough conjunctiva of the fornix for covering the defect of the tissue in the combined Kuhnt-Heisrath tarsus excision, then the same conjunctiva will be also sufficient for covering the denuded area of the tarsus, after the removal of the diseased hyaline degenerated conjunctiva from its surface.

These considerations have involuntarily been called forth after each performance of the combined Kuhnt-Heisrath tarsus excision for surgical interference in spring catarrh by me. When spring catarrh was being treated by operation, it seemed quite logical to me to leave the normal tarsus in its place, to remove all the affected conjunctiva from its surface, and to cover the denuded

area with the *healthy* conjunctiva of the fornix forward up to the border of the lid. (Antepositio Conjunctivae Fornicis.)

If the denuded tarsus after the removal of the diseased conjunctival tissue is not covered with healthy conjunctiva, then after the regeneration of the epithelium on the surface of the tarsus, the papillae, characteristic of spring catarrh, grow up again out of the islets of the conjunctival tissue which have remained; and all morbid symptoms of this disease return.

The name which I give to this operation, *i.e.*, Antepositio Conjunctivae Fornicis, corresponds to the actual performance of the operation. The deeply separated-off healthy conjunctiva fornicis is drawn forward on to the healthy tarsus of the lid, after removing the affected tarsal conjunctiva with diseased subconjunctival tissue.

Instruments required.—Jaeger's horn spatula, needle-holder, two silk sutures with one needle for drawing up the lid, and three silk sutures with needles at each end for three loop sutures. Forceps, a sharp scalpel, and half-bent scissors.

Anaesthetic.—As for the combined Kuhnt-Heisrath tarsus excision: 1·5 c.c. 2 per cent. novocaine + adrenalin are injected under the conjunctiva of the fornix, and 0·5 c.c. of the same solution under the skin of the lid border.

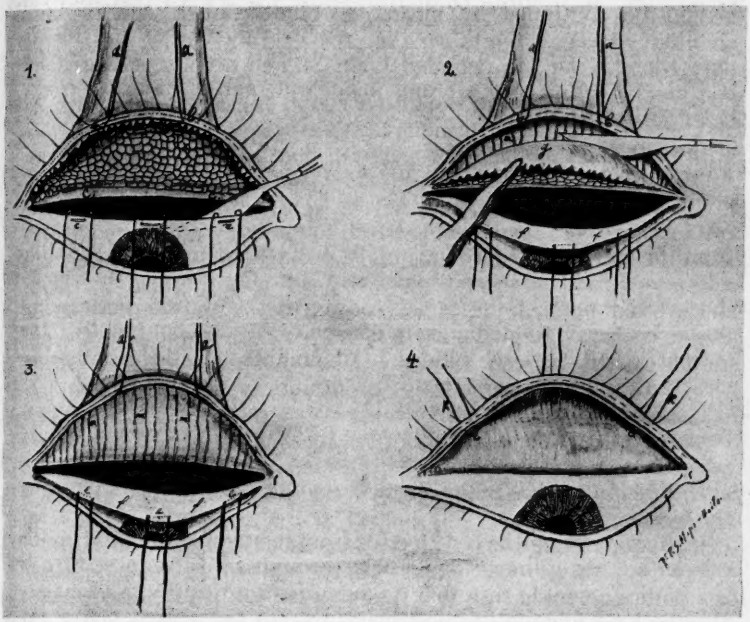
The Operation consists of Five Steps:

First Step. Inserting two Sutures Drawing the Everted Upper Lid on Spatula (*Fig.* 1*a*).

The needles are inserted in the skin of the lid border and brought out along the intermarginal line (Fig. 1*b*). One suture is placed on the margin of the middle and the outer thirds of the lid border; and the other suture, on the margin of the middle and the inner thirds. These two sutures are very convenient for strong retraction of the lid turned upwards on Jaeger's spatula, they do not touch the conjunctiva at all, and therefore, all the lid border conjunctiva, affected with papillary growth, is clearly seen. These sutures do not hinder the removal of the conjunctiva at its very margin which is impossible on applying any forceps to the lid border.

Second Step. Incision of the conjunctiva of the fornix along its whole length.

The incision is made 2 mms. below the demarcation line, dividing the affected tarsal conjunctiva, from the healthy conjunctiva of the fornix (Fig. 1*c*). The line of demarcation of the healthy conjunctiva of the fornix, made anaemic with adrenalin, stands out



clearly, if the lid is drawn tightly on Jaeger's spatula. Immediately after the incision, the bulbar part of the conjunctiva contracts and goes down. The subconjunctival tissue, denuded after the incision, is shown in figures as a wide black strip (Fig. 1*d*). Immediately after the incision in the conjunctiva, still not separated from the underlying tissues, three loop sutures are applied on its bulbar part, in its superficial layers, 1 mm. away from its border (Fig. 1*e*); one loop suture in the middle, one on the margin of the middle and outer thirds, and one on the margin of the middle and inner thirds. Thanks to the conjunctiva still adhering to the underlying tissue, the loop sutures applied at the very border of the bulbar conjunctiva, in the middle and at the sides, will precisely correspond to the middle and to the outer and inner thirds of the lid border.

Third Step. Drawing the conjunctiva of the fornix down and outwards, Separate it off carefully from the underlying tissue by means of blunt-headed scissors (*Fig.* 2*f*, *Fig.* 3*f*).

The conjunctiva thus separated off should be thin and not contain any underlying tissue. This separation of the conjunctiva

should be continued by means of blunt-headed scissors; and should be deep enough, so that the conjunctiva of the fornix may freely cover the denuded tarsus. The deeply separated off conjunctiva fornicis is everted, inside out, and is hanging freely down (Fig. 2*f*).

Fourth Step. The removal of the tarsal conjunctiva (*Fig.* 2*g*, *Fig.* 3*m*).

The tarsal conjunctiva affected with papillary growth is removed from the extreme border along all its surface, by means of saw-like movements with a sharp scalpel laid flat side down. In Fig 2*g* the everted part of the tarsal conjunctiva with the underlying tissue is seen. Immediately after removing the conjunctiva the normal tarsus is seen with the Meibomian glands glimmering clearly through its substance (Fig. 3*m*).

Usually, all the conjunctiva separates easily from the tarsus, from top to bottom, along its whole surface. The surgeon should take exceptional care that no traces of the affected conjunctiva and subconjunctival tissue are left on the border and surface of the tarsus.

If, by separating the conjunctiva from the tarsus, the Meibomian glands are not glimmering clearly through its substance, then it is a pathognomonic sign that the tarsus is not healthy, and mostly affected by trachoma in different stages not recognised before the operation. In such a case it is better to cut out the tarsus and perform a classical Kuhnt-Heisrath combined tarsus excision.

Fig. 3*m* shows what the normal tarsus is like, when all the affected tissue of the conjunctiva is removed from it and also, how deeply the bulbar conjunctiva is separated off and turned down (Fig. 3*f*).

(The letters indicate: *e*—the loops of the sutures seen through; *f*—conjunctiva fornicis turned out; *m*—Meibomian glands of the tarsus.)

Fifth Step. Carrying stitches through the tarsus and leading them out between the eyelashes (*Fig.* 4*e*, *Fig.* 4*k*).

As the correct application of sutures in the operation of Antepositio Conjunctivae Fornicis operation is very important for the cosmetic and therapeutic results of the operation, I consider it necessary to repeat the following once more: I apply the sutures on the border of the bulbar conjunctiva, not yet separated off, immediately after the incision. The needles of the three loop sutures are inserted 1 mm. away from the border of the conjunctiva, the width of the loop of each stitch on the exterior side of the conjunctiva being 2 mm.; the loops lie on the middle of the

conjunctiva and on the outer and inner third (Fig. 4*e*). Each needle of each loop stitch is pierced into the thickness of the tarsus 1 mm. away from its border and is carried slantwise, so as to go out between the eyelashes. In Fig. 4*a* is clearly seen: (1) the position of the loops on the conjunctiva (4*e*), (2) their exit between the eyelashes (4*k*). Due to the above method of applying the sutures, each needle passes slantwise in the thickness of the tarsus and has a compact tissue along all its course, thanks to which tight tying of the knots is not required, as the threads are held by the dense tissue of the tarsus. Resulting from the passage of the threads aslant from below upwards, the conjunctiva, being drawn by them, is drawn up to the extreme border of the lid, and finally, the above-mentioned leading of the sutures, after they are tied, gives a slight ectropion of the border of the upper lid. These sutures applied by me in the Kuhnt-Heisrath operation always give slight lid ectropion. They were demonstrated by me at the XIIIth Conference of Russian Ophthalmologists in Moscow in 1913, and elaborated on corpses at the Institute of Operative Surgery of Novorosseesk University (Odessa) directed by Professor N. K. Lissenkov and published in *Westnic. Ophthal.*, No. 6, 1914.

After inserting all the six needles, we receive three loop sutures. Drawing these sutures up, we draw the healthy fornix conjunctiva forwards on the denuded tarsus. Fig. 4 clearly demonstrates the result of the operation and position of the conjunctiva drawn on.

After the operation, a binocular bandage is applied for two days. On the third day the sutures are taken out, and again a bandage is applied for another two days. After four days the patient is sent home. The unpleasant manifestations of spring catarrh disappear entirely and immediately. The operation antepositio conjunctivae fornicis described has been applied by me already for eight years, in cases of severe forms of the disease.

Twenty-nine patients altogether have been operated upon by me on both eyes:—21 men and 8 women, between the ages of 20-39 years. I have observed a series of patients seven years after the operation. All the time they have not suffered from any of their former morbid sensations; there was no itching, burning or epiphora. The conjunctiva of the fornix drawn forward, covering the tarsus was free of all papillae; the lid border had a normal appearance.

In those cases where the lid border has not been thoroughly cleaned of papillary growths, and the conjunctiva has not been drawn up to the extreme lid border, separate papillae appeared again, but the itching was so slight that the patients returned to their work.

In view of the good results obtained by me in treating severe cases of spring catarrh by means of the operation " antepositio conjunctivae fornicis," and the simplicity of its performance, I beg to draw it to the attention of my colleagues.

In conclusion, it should also be mentioned that by means of the above operation the patient gets rid of morbid sensations caused by spring catarrh in the minimum of time (5-6 days). Patients on whom I operated belonged to the peasant or working class who cannot afford to spend much time for treatment for economic reasons, and were, therefore, very pleased to have got rid so rapidly of the disease which had been torturing them for several years.

Summary

In severe forms of spring catarrh neither the medicaments nor radio-therapy gives a cure. The surgical interference in the form of excision of the hard papillae of the conjunctiva of the tarsus, or their cauterisation gives only a temporary improvement. The partial excision of the tarsi advised by Axenfeld gives very little improvement, because the remaining tarsal conjunctiva is covered with papillae of spring catarrh. The combined Kuhnt-Heisrath tarsus excision applied by some authors is not justified either by the clinical or the pathological picture of the disease.

The author points out that pathological investigations have shown that in spring catarrh the tarsus of the lid is quite healthy, and the affection consists in the disease of the conjunctiva and subconjunctival tissue only, in consequence of the abnormal growth of this tissue and its hyaline degeneration in the region of the tarsal conjunctiva.

In view of the fact that the tarsus of the lid in spring catarrh is healthy, and the tarsal conjunctiva only is diseased, the author recommends careful excision of all the conjunctiva and subconjunctival tissue from the whole surface of the tarsus, beginning at the extreme lid border, and replacing it with healthy conjunctiva of the fornix. The author calls this operation " antepositio conjunctivae fornicis," as the conjunctiva of the fornix, separated deeply down towards the eyeball, is drawn forward on the tarsus, freed from the morbid conjunctiva and subconjunctival tissue.

The author has operated on 29 cases of severe forms of spring catarrh (21 men and 8 women aged between 20-39 years) according to the above method, during the past seven years. The results obtained proved quite satisfactory both from the therapeutic and cosmetic point of view, and no relapses have been observed during

the period of observation. Separate cases were observed seven years after the operation.

The operation consists of five steps described in the text and drawn in the attached Table.

The steadiness of the therapeutic results obtained, ease of the performance of the operation, the short duration of the post-operative treatment (5-6 days), all these data are, in the author's opinion, sufficient to recommend to oculists the application of the operation—antepositio conjunctivae fornicis—in severe forms of spring catarrh, not yielding to any other treatment.

A CASE OF ANGIOMA RETINAE

BY

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ANGIOMA retinae is an extremely rare anomaly or disease—it is in fact both of these simultaneously. Leber classifies the primary angioma and angiomatous degeneration of the retina together as Hippel-Czermak's disease of the retina, and gives a survey of 28 cases with which he was familiar. Czukrasz reports that during a period of 15 years at the Debrecen Hospital only two cases of angiogliosis retinae out of 100,000 cases of diseases of the eyes were encountered. Recently isolated cases of angiomatosis retinae, as well as several cases described as arterio-venous aneurysm, and one case of angioma of the choroid have been reported. Since, however, I have never found any case mentioned in literature available to me, similar to the angioma of the retina which was under my personal observation, I feel justified in recording the following case.

In June, 1937, Mrs. K.K., a specialist in children's diseases, came to consult me, and gave me the following history: 45 years of age, married, has no children (cause of childlessness known but of no significance as far as the disease of the eye is concerned), father died at the age of 67 years, of sepsis resulting from hypertrophy of the prostate, mother aged 74 years still in good health, five brothers and sisters, one of whom was killed in the Great War, the others in good health except for one stepbrother (descending from a different father) who has recently been suffering from diabetes. There have been no intermarriages in the family, nor have any diseases of the eyes been known of heretofore. Patient only had measles and mumps as a child. Married at age of 28 years, never gave birth, but had a doubtful abortion at one time.

Immediately after acquiring her doctor's degree she fell ill with apicitis following an attack of Spanish 'flu (in 1918-1919) and hence remained for a year's time in Davos where she recovered completely. Since then she does not cough, or perspire at night, and has a good appetite. Three years later, in the north of France, she suffered from a bad attack of enteritis membrano-mucosa, which left her in a state of exhaustion. Three years ago she had what has been rather doubtfully described as varicose veins (phlebitis?) in the left leg; and two years ago, shortly after her arrival in Palestine, she had papataci with recidivation.

During an accidental examination of her eyes in her seventh term of study, she learnt of the anomaly in her right eye. The visual acuity as well as the visual field of both eyes was quite normal. From 1931 up to the date when her right eye became diseased, she wore spectacles for a slight hyperopia of this eye.

On January 10, 1936, en route to Europe from Palestine, she was suddenly stricken with an illness in her right eye, in Salonica her sight began to fail rapidly in this eye, gradually becoming dimmer, until very soon it went entirely blind, and according to the patient, even failed to react to light perception. The pupil did not react to light to any extent whatsoever, and the reflex of the pupil was missing altogether. In March of the current year (1937) the doctors in Salonica and in Zagreb could see nothing of the fundus of the eye. In May, 1937, that is two months ago, the doctor in Zagreb could barely see a slight reflex from the pupil.

General Condition

Patient appears to be slightly neurasthenic and somewhat care-worn; she is tall, of pale complexion, insufficient panniculus adiposus, and according to her own account (patient, as mentioned above, is a physician) the apices of her lungs are darkened. She does not cough, voice is not hoarse, heart has no pathological findings, pulse 70-80, blood-pressure low (104), has a small angeioma on the scalp, three small naevi on the skin of the abdomen, other organs without pathological findings.

Ocular Condition

Right eye.—In strabismus divergens position (according to patient, only since she began to suffer from this eye, *i.e.*, over a year) patient prefers to wear a flap as the eye causes irritation since it has partly recovered its sight. In the lower eyelid, patient often feels fibrillar twitchings, especially when fatigued. Conjunctiva and cornea without pathological findings. Pupil of medium width and of equal size to that of the left eye, reacts

to light and accommodation. Skiascopy + 1.5 D.sph. visual acuity: sees movements of the hand in front of the eye, tension low Schiötz 9. Visual field cannot be measured; projection uncertain in supra-nasal direction, otherwise normal. Vitreous reveals thick flaked opacity. Picture appearing in ophthalmoscope (see illustration) is quite extraordinary—it may indeed be described as beautiful. In the region surrounding the papilla there is an outspread network of blood-vessels, in which upper and lower layers

ANGIOMA RETINAE

may be distinguished, partially entangled with each other. In the upper layer thick blood-vessels issue outwards in all directions (the thickest of these, which is almost of the thickness of the papilla, pointing downwards) and diminish spindle-wise in thickness after branching out, so that the network becomes thinner as it approaches the circumference. Below this, an entanglement of blood-vessels is visible, entwined among the upper ones, as mentioned above, and appearing like rings, in certain places. Within a range of approximately 6-7 times the width of the papilla, nothing but the blood-vessels can be seen. These are accompanied through their entire length by a white reflex, thereby making the fundus appear extraordinarily bright. At the circumference the retina is quite normally visible. Here, however, appear white areas of degeneration of the choroid, consisting

of two larger areas, approximately the size of the papilla (one, however, a little larger than the other) both being encrusted with pigment, and a third area much smaller, without pigment at the temporal edge, besides two additional areas, one in the infra-nasal direction and the other in the supra-nasal direction, both of which contain pigment. Adjoining this last-mentioned area and towards the upper part of the circumference of the fundus is a region approximately four or five times the width of the papilla with a grey-greenish sheen, *i.e.*, a partial surface detachment of the retina. Diaphano-scopical test with the Langé lamps produces a negative result.

Left eye.—The left eye is perfect in every respect, even the refraction being quite normal.

We have here, accordingly, an extremely rare case of apparently primary angioma which has not led to any other disturbances. The eye is far-sighted, 1·5 D.—a feature of the case which might perhaps be connected with the angioma. Up to the time of the disease, however, the sight of this eye was perfectly good and even the visual field was normal. Subsequently, however, haemorrhage into the vitreous occurred. It is doubtful whether this resulted from the papataci. It is, however, almost certainly connected with the anomaly of the eye, as in most of the cases that have been reported, as haemorrhage into the vitreous, as well as detachment of the retina occurs, although these were usually cases of angiomatosis retinae, whereas our case may be described as angioma retinae. It has been claimed that this disease may be related to tuberculosis. In this case, however, although the lungs reveal pathological findings, it would be most rash to connect the angioma or the detachment of the retina with the affection of the lungs. It is well known that haemorrhage into the vitreous on a tubercular basis occurs in the case of people who feel perfectly well, and whose lungs show no pathological findings, as well as in the case of young people below the age of 30 years. It is therefore more feasible to classify the haemorrhage into the vitreous and the detachment of the retina under the heading of angioma retinae although this may be left an open question.

It would be of interest to consider whether the naevi angiomatosi should also be included in this classification. Ludwig reports a case of angioma of the choroid accompanied by a red birth-mark, whereas Leber remarks that " no cases of complications with a telangiectasia or naevus vasculosus in another part of the body are known of," but this is not so in our case.

Implication of the brain, however, is indisputable. According to Lindau, in 20 per cent. of the cases of angiomatosis retinae, intracranial tumour occurs (these are usually cerebellar cysts) which are in reality angioplastic tumours and may be classified

with the hyperplastic haemangioma group. It should be mentioned moreover, that Meller is of the opinon (contested, it is true) that in such cases there is an abundance of glia in the retina with a consequent degeneration which is followed by a development of the blood-vessels, and accordingly he calls this process gliosis retinae diffusa teleangiectodes. In a similar case, others refer to angiogliosis retinae. Hence the relationship to the cerebellar cysts may be recognised. Junius, however, refers to defective formation of the blood-vessels in one or more parts of the body. The origin of the anomaly is to be looked for in the third month of the foetus. Von Hippel believes that it is of ectodermal origin, whereas others hold the opinion that the origin is entodermal. Observations have been made of several cases in the same family, as well as of cases of both eyes being affected. Rochat believes that this disease is transmitted by the mother. According to Virchow, the angioma develops in all parts of the body from a telangiectasia which may escape attention at the time of birth and develop subsequently after 25, 30 or 40 years into cavernous angioma. It is believed that the cavernous angiomata of the internal organs belong to this group whose development is thus deferred. This point of view explains the fact that the angioma of the retina as well as the implication of internal organs, especially the cerebrum, becomes manifest comparatively late in life. In addition to the Lindau cerebellar cysts, cerebral tumours and tumours of the spinal cord are referred to as complications of angioma retinae. Thus, Prevec declares that a certain case of angiomatosis retinae reported by him was associated with a pathological process in the spinal column which was diagnosed by surgeons as an intramedullar cystic tumour, and consequently he refers to " angiomatosis retinae et medullae spinalis."

In conclusion, the extreme rarity and the extraordinary aspect of this case should be emphasised. Leber writes that " the extension of the vessels does not usually commence to an equally great degree in the immediate vicinity of the papilla, but develops to its full height gradually at some distance from it, so that the blood-vessels are much broader before their entrance to the knot than at the papilla." Now in our case the posterior pole of the eye is entirely occupied by the angioma so that none of the papilla whatsoever is visible, whereas at the circumference the retina is more or less normally visible. In the Niccol and Moore case the angiomatous change is immediately adjoining the papilla but sharply defined, resembling a raspberry, of a reddish or purplish colour, tumour-like, projecting approximately 3 D. into the vitreous. The eye was removed. The cases reported as angiogliosis retinae are quite different. At this stage increase of tension is also reported, whereas in our case, the eye shows hypotension.

As far as the brain is concerned, no objective changes are indicated. The "nervousness" which is definitely present, may be amply justified on psychical grounds (childless condition) and for other reasons as well.

After six months' observation no changes in the condition of the eye could be noted.

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THE MICROSTRUCTURE OF EPITHELIAL CELLS AND ITS IMPORTANCE FOR THE AETIOLOGY OF TRACHOMA*

BY

PROFESSOR DR. WILHELM GRÜTER

MARBURG

AN analysis of the different cell bodies, in particular of Prowaczek's bodies, presupposes thorough knowledge of all microstructures of the normal cell. Reliable judgment can be formed only from comparative study of the effect of organic and inorganic (chemical) reagents.

Analysis of the apparatus of Golgi occupies the front rank. There is considerable difference of opinion as to its existence *in vivo*. Some research workers consider it to be artificially produced, while others, *e.g.*, Zeiger, claim that it is invisible in the dark field in vital examination.

Material and Technique of Investigation

Material.—Variola vaccine, herpes, diphtheria toxin, staphylococcic toxin, mustard oil, trachoma and conjunctivitis blennorrhoeica.

* Report read at the International Congress of Ophthalmology, December 10 1937. Translation by the International Organisation against Trachoma.

Methods.—Staining with haematoxylin-eosin, iron-haematoxylin, giemsa, Lindner's contrast-stains, Biondi-Heidenhain and several special stains, also osmium impregnation by Kolatschew-Nassonow's method, Janus green.

Vital Examination against the light with oblique condenser, dark field (with ultra-violet light), hydrous neutral red and methylene blue solutions.

The examination of material dealt partially with experimentally produced inflammatory processes on the cornea of rabbits and partially with human material. The various individual results were verified by comparative studies of inflammation set up by these toxins.

Photographic filming of cell conditions by Leica film and suitable enlargement.

I succeeded in proving that Golgi's apparatus is not an artificial product of staining but a substantial nuclear structure of characteristic shape and fissiparism. This coroniform structure surrounds the nucleus and can be seen particularly well in flat cells (flat section or vital suspension). It is a three-dimensional reticulated structure with honeycomb-shaped interstices. In the nodes are fine granules which must be considered as products of secretion, to judge by the vital stain with neutral red and according to present anatomical terminology. These granules have the shape of very minute micrococci and show the same type of fissation, new granules separating from the primary structure after fission. Within this coroniform Golgi zone are found ballonets, perfectly transparent, which become more distinct with the progress of inflammation and also divide by fission into minute transparent bubbles. Frequently large blisters are formed by the cohesion of primary and secondary ballonets. These "foamlike" structures are met with not only in the coroniform Golgi zone, but also scattered through the cytoplasmic zone.

While Golgi's apparatus has so far been considered a coroniform structure surrounding the nucleus, my investigations show that Golgi's apparatus is a regular reticulated capsule enclosing not only the nucleus but also another polyhedral structure which latter forms a normal part of the cell and undoubtedly belongs to the nuclear zone, both topographically and structurally. It is a regular polyhedron built up of numerous other small polyhedra. This structure, round or slightly flattened and ovoid, occurred in the epithelium examined, under the nuclear cavity and was connected with the nucleus by a reticulation (a portion of the Golgi apparatus). The latter and the polyhedral structure referred to are in their turn surrounded by the Golgi capsule already described which shows a callosity (coroniform portion of Golgi's apparatus) at the spot where the nucleus and the polyhedral body

are in contact. This polyhedral body, called " interior reticulated body," can be observed in its peculiar form and topographical relation only in an inflamed cell, but this pathological condition allows of judging the normal conditions *in vivo* (seen against the light) and thus will not be visible in the dark field and it stains to any appreciable extent only when inflammatory swelling and clouding has caused its physical and chemical property to change. This " interior reticulated body " can thus be shown particularly clearly in keratitis due to variola vaccine or to herpes, either in the dark field or by means of various staining methods (osmium impregnation or vital staining of fresh preparation with neutral red). On such occasions it will be seen that this interior reticulated body is unusually liable to swell, something like a sponge and reacting easily—to very different physiological and pathological stimuli (dark field photographs of physiologically irritated and herpetically inflamed cell). Observation in the dark field also shows that this polyhedral structure multiplies by fissure, forming new polyhedral buds anywhere on the surface. In every inflamed cell (in acute inflammation more quickly and strongly than in chronic inflammation) a diffuse fine sediment develops, of silvery-grey reflection in the dark field and assuming a yellowish-red to orange red tinge by almost any eosin stain. These observations would seem to indicate that the inflammatory sediment in the polyhedral structures is albumen. Osmium impregnation colours this inflammatory sediment an intense black. Staining with Soudan gave negative results, showing that fatty degeneration was not responsible. The same colouration or clouding of albuminous sediment is observed also in the reticular nodules, *i.e.*, the secretory granules in the inflamed cell, so that the contents stain reddish with eosin, while the cocciform capsule retains a more or less bluish red (haematoxylin) shade.

This " interior reticulated body " has been repeatedly referred to before in literature, *e.g.*, by Hückel (1898) in describing keratitis of rabbits set up by variola vaccine; nothing further has, however, become known as to its peculiar fission and its occurrence in the normal cell. The various virus diseases of this structure have already been described in modern literature (eosinophil polyhedron) without any definite data as to its origin and relations to the various cell structures.

Observations in Trachoma

On examination of epithelium in trachoma and conjunctivitis blennorrhoeica the following observations were made as a result of vital and staining methods:—

1. The secretory granulations swell and divide in the trachomatous epithelium. This process is diffuse (both in Golgi's

apparatus and in the cytoplasmic zone) or focal (hood-shaped) (osmium impregnation).

2. The ballonet structures referred to above swell up and divide both in the zone of Golgi and in the cytoplasmic zone.

3.—The " interior reticulated body " swells and turns cloudy (as can be seen clearly in the dark field and against the light). Typical signs of division then appear (fission of the polyhedral parts). An albuminous sediment forms in the honeycomb-like spaces in the polyhedral parts (visible in dark field and by eosin staining). Lastly, appear fine nodules and still finer granules (like strings of pearls) on the interior reticulated body.

The *Hood-shaped structure* (Prowaczek's bodies) are not homogeneous but consist of various partial structures:—

(*a*) Focal proliferation of Golgi's sheath with more pronounced proliferation of the secretory granules (osmium images). These have also been described by V. Reiss (*Arch. f. Ophthal.*, 1913).

(*b*) Interior reticulated body or partial structures protruding from under the nuclear calotte. Extremely fine nodules and granules appear (elementary bodies according to virus nomenclature).

(*c*) Combination of (*a*) and (*b*), the reticulated body detaching itself and the inflamed Golgi sheath becoming stained with it.

Conclusions

Inflamed trachomatous epithelial cells cannot be shown to contain any granular structures of a nature different from their own, whether in the Golgi zone, the interior reticulated body as described or in the cytoplasmic zone.

A comparison of Herzberg's Victoria Blue stains with the results mentioned above which were obtained with a number of Grüter's organic and inorganic cell toxins, in particular a comparison with epithelium conditions in trachoma, shows that the granular structures produced by many different techniques with all cell toxins are absolutely alike. They are seen particularly clearly when photographed in the dark field. It will then be seen again and again that the granules are primarily situated in the nodules, *i.e.*, that as the cell inflammation progresses, the mitochondrial granules become particularly clear. I cannot accordingly claim that the various granular structures described in literature, and tested by me by so many different methods, are foreign substances, *i.e.*, initial structures of a hitherto invisible disease germ in the cell.

I hold the same view in regard to the finding of Busacca, who claims to have shown rickettsias in trachomatous epithelial cells on the strength of examination of cells in yellow fever. I consider that these " trachoma rickettsias " are inflammatory proliferations and divisions of granula which normally occur in the epithelial cells.

ANNOTATIONS

Blindness and its Prevention

A remarkable volume of 283 pages has been published by the International Association for the Prevention of Blindness relating to blindness throughout the world and its prevention. It is entitled " The number of the blind and the protection of the eyes in different countries," and may be obtained at the headquarters of the Association, 66, Boulevard Saint-Michel, Paris (VI).

The volume is based on the replies from 35 different countries to a questionnaire sent out two years ago. The replies emanated from Government Departments, and from oculists and others who had access to hospitals and local government reports. They were completed by data supplied by the International Labour Office of the League of Nations.

The problem of the prevention of blindness is very largely a social and economic problem; it is not exclusively scientific, although it must be approached under the guidance of opthalmologists.

A distinction must be drawn between societies for the welfare of the blind, and committees which deal with the prevention of blindness. It is with the latter only that the present volume is concerned, and the subject is of vital importance to every nation, for it is not only the effect of diseases in the causation of blindness that has to be considered, but also the hazards of industrial occupations. Although in many countries there are regulations for the protection of the eyes of workmen in occupations where harmful liquids, particles and light-rays may do damage, it is often necessary to educate the workmen as to the value of the precautions advised.

The Prevention of Blindness Committee in England (66, Victoria Street, London, S.W.1) and the National Society for the Prevention of Blindness (New York) have each performed important national functions; the former by its collaboration with the Ministry of Health in organising the registration of the blind and the causes of blindness, and the latter by its pervading influence in the United States and by the possession of considerable resources.

By the publication of the present volume the International Association for the Prevention of Blindness has shown that its Executive Committee, and especially the compiler of the present volume, Dr. A. Churchill, have an admirable and practical knowledge of their subject. It is regrettable that their financial resources are so small. It is of real importance that the Association shall

continue to flourish; it interferes with no national organisation, it can give advice to newly formed national societies, and it can bring together for international study the different problems with which different countries are confronted.

The prevention of blindness takes an entirely different aspect according to the nature of the country in which it is considered, whether temperate or tropical. In temperate countries such as Great Britain, France, Germany and the greater part of the United States of America the causes of blindness from infectious disease are diminishing, but from industrial eye injuries and refraction errors are increasing. However, in tropical countries the campaign against the causes of blindness is an infinitely more serious and urgent problem. To the severe endemic diseases (infectious conjunctivitis, small-pox, gonorrhoea, trachoma, syphilis) are added the starvation disease, xerophthalmia, and the results of quackery.

The International Association for the Prevention of Blindness had its origin at the XIII Concilium Ophthalmologicum, and therefore among ophthalmologists; however, the necessity of social measures to effect some of the objects of the Association seems to call for the co-operation of sub-committees composed of industrialists and other non-medical members.

Statistics of the number of blind per 100,000 of the population vary from 776 in the case of Egypt, to 32 in the case of New Zealand. When an increase in the proportion of blind appears in statistics it does not necessarily mean that there is any real increase of blindness, but that greater care is taken in the registration of blind persons.

This important report is full of interest; it deserves study by all social workers, as well as by officials of all Ministries of Health, and by all Medical Officers of Health.

Variations on a Theme

Jaeger 1 may sometimes prove a stumbling block even to those with adequate near vision, and when this occurs the patient may unwittingly be subjecting himself to what is almost a form of psycho-analysis. A paragraph familiar to many ophthalmologists begins with the words " It was upon a delicious summer morning." Several, of the bright young thing type, particularly if they are in their first season, will render this " It was upon a delirious summer evening." A solicitor who specialised in divorce work, read it as " It was upon a delicate matter," whereas a woman who was verging upon religious mania beamed all over her face and read " It was upon a dedication morning." Another paragraph, Jaeger 4 this time, which begins, " I have always suspected

public taste," is fairly frequently rendered " I have always respected public taste," by Sisters of Mercy and just those nice kindly people who are incapable of suspecting anybody or anything.

The sterner type comes into its own with the recently published Jaeger 1, beginning " Hope they say deserts us at no period of our existence." The first word of this is changed into hops and the reader very often appears as though he believed the statement or at any rate hoped that it was true. Aviators, particularly if they have been flying over sandy wastes, turn the word deserts into a noun and for them of course " hops " have a different significance.

Whether these mistakes can be turned to any practical account in the technique of psycho-analysis is more than doubtful, but their occasional occurrence serves to relieve the tedium of hearing the same familiar sentences read over and over again.

ABSTRACTS

MISCELLANEOUS

(1) **Cargill, L. Vernon (London).—The Ophthalmological Society of the United Kingdom).** *Medical Press and Circular*, January, 1937.

(1) The first of the third series of articles on British Medical Societies, which are a most interesting feature of the ***Medical Press and Circular*** is indicated in the title of our abstract. **Mr. Cargill** is to be congratulated on the excellent epitome of the history of the society during its life of 57 years, which he has written. He has obviously taken great trouble in consulting early minute books and the volumes of Transactions and, of course, as he joined the Society when it was only ten years old he can speak with first-hand knowledge of the greater part of its career.

The paper is illustrated by reproductions of portraits of Sir William Bowman and Edward Nettleship together with the Presidential Badge. We hope that all ophthalmic surgeons will read it.

As far back as 1884 a committee was appointed to inquire into the prevention of blindness from ophthalmia neonatorum and a deputation headed by Sir William Bowman and Jonathan Hutchinson waited on the authorities of the Local Government Board. In the Transactions for the following year will be found

the report of this discussion with the Local Government Board. "The Registrar-General could not see his way to advising that the suggestions of the Society be carried into effect, and the L.G.B. representative reminded the deputation that the Board had no power to *order* Boards of Guardians to do anything, although, he added, the Guardians had always shown readiness in carrying out suggestions." How times have changed in the past 50 years! We should perhaps remind the author that among the original members still alive are Sir Thomas Barlow and Sir George Berry. They are now honorary members and Sir Lindo Ferguson is, as he says, the sole surviving subscribing original member.

R. R. J.

(2) **Bhaduri, B. N. (Calcutta).—Corneal complications in meningococcal cerebro-spinal meningitis.** *Calcutta Med. Jl.*, December, 1937.

(2) **Bhaduri** comments on the rarity of corneal involvement in meningococcal meningitis. From 1929 to 1935 about 225 cases of meningococcal meningitis were admitted into the Carmichael Medical College Hospital. Only two cases had corneal complications. The first occurred in a boy of 13 years of age. He was admitted in the first week of the disease in a semicomatose state. A small hypopyon was present in the right eye and faint infiltrates in the substantia propria of the left. Both eyes were congested. Neither eye stained with fluorescein, the pupils were well dilated by atropine, and tension was normal. Two days later the cornea was extensively involved, only a rim in the periphery remaining clear. The boy recovered in about two months. With clearing of the cornea the lens was found to be subluxated and exudates were present in the fundus. Three months later the cornea was clear, tension normal, no deep vessels or precipitates were present; vision was reduced to bare P.L.

The second case occurred in a medical man, aged 37 years. He was fully conscious during the first week. Each cornea showed an almost complete annular opacity which appeared to be in the superficial layers. The opacity gradually increased, and on the ninth day the centre of the cornea became hazy. There was no staining with fluorescein, and no hypopyon was seen.

Paracentesis was performed on the 16th day in both eyes. Turbid fluid emerged. The condition got worse in the left eye and on the 24th day the bulging central portion of the cornea burst. Later both eyes atrophied, but the systemic infection was controlled.

R. R. J.

(3) **Charlin (Santiago, Chili).—Neuritis affecting the nasal and other branches of the trigeminal. (Neurite del nasal e neuralgia essenziale del trigemino).** *Boll. d'Ocul.*, November, 1937.

(3) **Charlin** draws attention to a series of cases which have come under his observation in which an acute unilateral rhinitis was accompanied by violent neuralgia affecting all the frontal-orbital region, and a corneal ulcer. The first case was entirely relieved by the application of cocaine and adrenalin. Later cases were not so easily relieved, and the author sought some general cause for them. In one case the hilar glands were shown by the radiogram to be affected and the diagnosis was thought to be confirmed by an intradermal injection of tuberculin (Mantoux's reaction). To the surprise of every one the injection was speedily followed by complete cure. In a second case the single injection was equally successful. A third case required repeated injection of antigen (antigeno metilico) before the relief was complete.

HAROLD GRIMSDALE.

(4) **Pierre Halbron.—Clinical study of some reciprocal nervous reactions between the eye and the nose. (Étude clinique de certaines interreactions nerveuses oculo-nasales.** *Ann. d'Ocul.*, Vol. CLXXIX, p. 145, March, 1937.

(4) **Pierre Halbron** discusses the syndrome of the naso-ciliary nerve (Charlin) and the syndrome of the spheno-palatine ganglion (Sluder). As the abstract on Dubois-Poulsen's paper on the eye and the spheno-palatine ganglion gives a more detailed description of the French views on this subject, it seems sufficient to record some difference of opinion shown in the papers of both authors. Dubois-Poulsen claims the identity of both syndromes; the author points out that the involvement of the anterior segment of the eye in Charlin's syndrome differs from the sympathetic irritation of the eye in Sluder's syndrome. There are painful points in the skin supplied by the naso-ciliary nerve while the ganglion does not possess a cutaneous projection. The nasal congestion in Charlin's syndrome is more marked in the anterior parts of the nose, in Sluder's syndrome the posterior parts are congested. Cocainisation of the anterior part brings on relief only in Charlin's syndrome and cocainisation of the posterior parts only in Sluder's syndrome.

HUMPHREY NEAME.

(5) **Tita (Catania).—A case of tower-skull with unilateral exophthalmos. (Sul un caso di turricefalia con esoftalmo unilaterale).** *Boll. d'Ocul.*, November, 1937.

(5) **Tita's** case is that of a child whose parents were normal; the father extremely dolichocephalic. The child showed a tower

skull with a bulging occipital region. The left eye had been noted to be prominent for about a year. Vision in each 6/6. Radiograms of the skull showed dolichocephaly with lateral compression of the frontal region and an enlargement affecting all the squamous portion of the occipital. The left sphenoidal sinus was opaque. The child was healthy except for enlargement of the tonsils.

The author discusses the possible causes of the premature synostosis which is the immediate cause of the cranial condition and thinks that it may to some extent depend on the state of the tonsils which may have set up an inflammatory condition of the bone and in its covering in the neighbourhood, and so led to a closing of the sutures. The one-sided exophthalmos depended on the asymmetry of the orbital roofs.

HAROLD GRIMSDALE.

BOOK NOTICES

Neuro-Ophthalmology. By R. LINDSAY REA, F.R.C.S. Pp. 516, 19 Coloured Plates, 141 Illustrations. Publishers: William Heinemann. Price, 42s.

The object of the author in writing this book has been "to supply an answer to the queries regarding those subjects which form a connecting link between ophthalmology and neurology." In doing this, he has had to write both for the neurologist and for the ophthalmologist, and for the benefit of the one include a good deal of matter which could have easily been omitted, had he been writing only for the other. Chapter I, for example, on "equipment necessary for examination of the eye," would not have been required if the needs of the ophthalmic surgeon alone were being studied. It is rather surprising to read in it that "the small electric ophthalmoscope with a prism reflector is infinitely better than the mirror with a slit."

The material of the book is divided into 17 chapters and one's general impression is two-fold; first, that these include much information not generally available in the ordinary text-books of ophthalmology and, secondly, that where subjects are described which are common knowledge to ophthalmic surgeons, they are described in a fuller manner than is possible in a book limited to ophthalmology. A notable example of this occurs in the chapter on poisons which affect vision. Another point which will strike the reader is the descriptions of conditions which, although of fairly common occurrence, seem to have escaped notice; for example, "neuralgia of the eye," of which the author himself has

had personal experience. As a contrast to this there are also descriptions of rare conditions with which the ophthalmologist might be confronted, such as Sanger Brown's ataxia and Girlier's disease. The neurologist would probably find that the descriptions of the nervous diseases were too brief, but to the ophthalmologist their inclusion enhances the value of this volume for purposes of reference and in puzzling cases. A book of this character inevitably lends itself to criticism, but the following are put forward as constructive suggestions and not in any carping spirit. In discussing ocular palsies due to brain stem lesions, the author states that in tumours in the region of the pons, headache, vomiting and papilloedema will point to a true diagnosis, whereas it is well known that papilloedema hardly ever occurs in tumours limited to the pons. In discussing amblyopia ex anopsia it is stated that the sight of an amblyopic eye cannot be restored after seven years of age, a finding that is at variance with that of most orthoptic trainers. The description of the action of the extra-ocular muscles is not as clear as it might be and no mention is made of the effects of spasm. In describing papilloedema, the author has omitted to mention the occurrence of striation of the haemorrhages along lines concentric with the disc margin and states that " if the pressure produced by papilloedema has been allowed to continue say for two or three months, a consecutive atrophy is almost inevitable." It is a pity also that he has not given any explanation of the Foster-Kennedy syndrome. In describing tabetic optic atrophy, he says that " the vessels are usually reduced in calibre," whereas the contrary is generally the case and it is just this feature which is often helpful in coming to a diagnosis. In the same chapter he also states, " to miss the discovery of the slight pallor of the disc is indeed a serious error." Physiological variations in the colour of the temporal part of the disc however, render this a counsel of perfection, and it is only when the pallor is definitely established that anything like a certain diagnosis can be made. The author is apt to become rather propagandist in the section dealing with alcoholism. The statement that his " simple advice to young men is to avoid the habit of taking any beverage containing alcohol " is no doubt excellent, but it seems a little out of place in a text-book. In spite of these criticisms, however, neuro-ophthalmology is a useful addition to the ophthalmic surgeon's library. Particularly valuable are the tabulated lists of causes of various conditions (*e.g.*, those of unilateral proptosis), the account of the X-ray examination of the optic canal, the article on neurosyphilis and that on word blindness. Conditions such as Schilder's disease and neuromyelitis optica are well described, as are many others which are outside the scope of the ordinary text-book on eyes.

Report on an Analysis of a Preliminary Classification of the Causes of Blindness. 1938.

This Report on the causes of blindness, by the Prevention of Blindness Committee, follows on the Report issued in 1936, which was reviewed in our columns, Vol. XX, p. 487. The Committee found that the total number of blind registered in 1936 was nearly double that noted in 1921 by the Departmental Committee. This is entirely due to the fact that with improved methods of ascertainment and registration, coupled with the increased benefits which are available for the registered blind, a great many more persons were on the blind register in 1936 than in the former year. It does not mean any increase in the incidence of blindness. The figures of the registered blind do, however, indicate that the greater number of cases of blindness occur in the later years of life, in the age groups over 50.

The Committee have now analysed 6,280 cases of blindness out of about 20,000 forms, mainly Ministry of Health form B.D.8; but including some cases of Board of Education, 37D. Here they comment on a group of 5,290 cases and contrast the figures obtained with those of the Glasgow clinic of Scotland, 2,748 cases, and with Birmingham, 1,000 cases. The figures are of great interest. Primary cataract accounts for a percentage of 24·97 in England and Wales against 16·4 in Scotland and 18·8 in Birmingham. England and Wales show a percentage of 11·09 in glaucoma, Scotland 8·10 and Birmingham 6·9. Among congenital, hereditary and developmental causes England and Wales show a percentage of 10·96, Scotland 3·85 and Birmingham 9·0. In similar order myopia gives percentages of 10·24, 17·10 and 4·4; local infection of the coats of the eye, 5·97, 2·40 and 4·3; syphilis (acquired) 2·83, 6·55 and 3·7, while congenital syphilis gives 5·12, 4·23 and 11·1; ophthalmia neonatorum gives 4·91, 3·20 and 8·6. Industrial trauma and disease 1·39, 2·65 and 1·9; while other categories give 22·52, 35·52 and 31·3 respectively.

Two thirds of the cases analysed for England and Wales were over 50 years at the date of examination.

These sectional headings are discussed shortly. The Committee suggests that a further examination and sub-division of the glaucoma category might provide pointers for further research.

The high figure for myopia in the Scottish list is noteworthy; the Committee suggest that it would be valuable to ascertain the age at which blindness supervened and whether the incidence of blindness due to myopia is greater in those engaged in manual work or in work needing close application of the eyes.

In the ophthalmia neonatorum group the figures have been scrutinised in relation to the age at the date of examination. 16·15

were born since 1914 and none since 1932. The remaining 83·85 per cent. were born before the special machinery of the Public Health (ophthalmia neonatorum) Regulations came into effect in 1914. And 50 per cent. of all the cases were over 40 years of age at the date of examination.

Three very valuable appendices are added in tabular form; the first deals with the 6,280 causes of blindness, the second with the cataract cases and the last with cases of sympathetic ophthalmitis following injury in children under 16 years of age.

We hope that we have said enough to show that this Report is a very fine piece of work, and one which should be carefully considered by all concerned in the prevention of blindness. Miss Cracknall, the Secretary of the Committee, informs us that the Minister of Health has notified his intention of appointing a Standing Advisory Committee on blindness and its prevention, which will henceforth carry on the work undertaken previously by the Prevention of Blindness Committee. This is very satisfactory, but we must never forget what we owe to the enormous amount of work done by the Committee on a voluntary basis.

Studies on the Physiology of the Eye. Re-issue with Supplement. By J. GRANDSON BYRNE. Pp. 440, 52 Illustrations. H. K. Lewis & Co., Ltd. Price, 40s. 1938.

The re-issue of this book has, in addition to the contents of the edition published in 1933, a supplement which is devoted to an account of the effect of stimulation of the cortex cerebri upon the effector mechanisms which mediate movements of the iris and membrana tympani, and there is a new index.

This book contains an account of experimental studies in certain physiological phenomena of the eyes and is divided into four parts.

Part I has been published in the *American Journal of Physiology*, 1921-29, and except for the experiments on the " functions of the cervical sympathetic as manifested in its active currents (Chapter VII) done in collaboration with Professor Willem Einthoven, of Leiden University, this work is solely the product of the author's own thought and research experiences.

Each chapter contains a brief survey of the literature pertaining to the subject, an account of the methods used in the animal experiments the author has performed and the facts gleaned from these experiments, followed by a discussion of their significance. A summary and the relevant bibliography is appended at the end of each chapter.

The author has endeavoured to show the levels or stages in the development of the ocular effector mechanisms from the primitive

type in which activation is effected by chemical means to the intermediate or chemico-neural type in which neural impulses initiated in the related centre are the effective agents, and thence to the higher level where the effector mechanisms are of the neuro-neural or reflex type in which activation is brought about by afferent and efferent impulses. The widening and narrowing of the palpebral fissure and the pupil, retraction and proptosis of the eye, the changes in the curvature of the lens, and the reciprocal relations of the effector mechanisms are studied.

A number of animal experiments traumatising peripheral nerves, muscles and viscera are described to illustrate that reflex palpebral and pupillary narrowing and retraction of the eye are activated from the afferent side by proprio-ceptive impulses of the preponderantly critical variety which pass through the para-sympathetic system. Reflex palpebral and pupillary widening and proptosis are activated by afferent impulses of the preponder-antly affective variety through the sympathetic system.

The physiological phenomena in the mechanism of approach, avoidance and standstill (still reaction) and the inception of a psychic element in these are discussed.

Whenever possible the author has endeavoured to explain certain physiological facts which may have some clinical diag-nostic significance, but the book will interest chiefly the research worker in physiology rather than the physician, ophthalmic practitioner and student. There are a number of illustrations, mainly photographs of cats, drum-tracings and diagrams.

The paper and print are good and the book well produced.

External Diseases of the Eye. Second Edition. By DONALD T. ATKINSON, M.D., F.A.C.S. Consulting Ophthalmologist to the Santa Rosa Infirmary and the Nix Hospital, San Antonio, Texas. Pp. 718. London: Henry Kimpton. Price, 36s. 1937.

The second edition of this book has been enriched by additional suggestions on slit-lamp microscopy, orthoptic training and certain ocular manifestations believed to be of an allergic character.

The object of this work is to describe and illustrate those ocular disorders which may be detected without the aid of an ophthalmo-scope. Many diseases rarely seen in this country such as yaws, fungus diseases, and leprosy are described. The author is to be commended on including a chapter on intranasal diseases associated with ocular disorders.

The book is profusely illustrated with black and white drawings of diseases and ophthalmic operations, photographs and pictures of wax models. Whilst many of these are good some are definitely

poor. It is regrettable to see several obvious mistakes in surgical technique, for instance an incision for a chalazion made transversely across the Meibomian ducts "for 6 mm."; and the application of the fixation forceps in cataract extraction to the bulbar conjunctiva in the upper nasal quadrant and quite remote from the limbus.

The legend beneath the drawing showing a glaucoma iridectomy describes a corneal incision with a keratome, whereas the incision should be definitely scleral when performing this operation.

However, there is much that is of practical value in the book, and in Chapter XIV there are some useful notes on history taking and the keeping of case records. The last chapter is devoted to an account of the remedies used in the treatment of external diseases of the eye.

The book is well produced and will be of value to the student and general practitioner.

Ophthalmic Operations. Third Edition. By GRIMSDALE and BREWERTON. Pp. 322. 105 Illustrations. London: Baillière. Tindall & Cox. Price, 17s. 6d. 1937.

This text-book has enjoyed a prominent place among works on operative ophthalmic surgery written in English, and a third edition is a testimony to its appreciation by students and practitioners.

The book is richly illustrated by diagrams and line drawings which show clearly the main steps in the operation that is described.

The authors have kept to their original design in giving the student an outline of the chief ways in which various problems may be attacked, leaving him to adapt some one of these to his particular requirements.

In some of the more recently devised ophthalmic operations a greater wealth of descriptive detail would not have been out of place. The technique of intra-capsular extraction is a case in point on which the authors could have written at greater length, particularly about the intricate manoeuvres involved.

There is a good account of the various surgical methods of treating retinal detachment and half a page is devoted to a brief comment on radiotherapy, in this section radon seeds have been incorrectly termed "radium" seeds.

At the end of each chapter there is an ample bibliography. The book is written in an interesting and lucid manner by two ophthalmic surgeons of considerable experience and sound ideas.

CORRESPONDENCE

ATROPINE IRRITATION

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

SIRS,—I have read with great interest the account of the thorough investigation of atropine irritation published in the Transactions of the Ophthalmological Society—Part I—1937.

In Southern Australia 1 per cent. atropine solutions are freely used as a matter of routine in adults and atropine irritation is not common, though I think more often seen where 2 per cent. atropine ointment is employed. When irritation does occur and a mydriatic is essential I have found scopolamine ¼ to ½ per cent. effective and have not seen irritation follow its use.

But the discussion brought to mind the considerable reactions which I have seen following the use of cocaine especially in elderly people. One patient had so marked an idiosyncracy that one drop of a 5 per cent. solution of cocaine hydrochlor. dropped into the conjunctival sac caused almost serious illness of a week's duration. Blebs formed on the skin of the face and neck and violent conjunctivitis ensued. I have seen several milder cases, troublesome enough in all conscience, but all controllable by zinc sulphate solution ¼ per cent. which seems to be the remedy for all these curious manifestations.

It is rather remarkable that the injection of atropine into the conjunctiva, so frequently practised to obtain extreme mydriasis in iritic conditions, has in my experience so far never caused these curious reactions.

As regards atropine the position is so often reached that mydriasis is essential and so far the use of scopolamine has solved the difficulty. Though reference is made to its toxic action I have used the ½ per cent. solution up to four times in the 24 hours and notwithstanding careful observations no toxic results have been apparent. I have, however, never used it in the form of ointment.

Whilst writing may I put a question to which an answer seems difficult, though Dr. Lockhart Gibson has made a suggestion. Salts, especially chlorides, seem able to enter the eye through the centre of the cornea; with animals' eyes this can be easily demonstrated. A solution of atropine 1 in 50 million parts will affect the iris. But how does the atropine act and almost instantaneously in the sub-conjunctival injection?

I am, etc.,

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101-103, COLLINS STREET,
MELBOURNE, C1.

February 2, 1938.

NOTES

Honour

Mr. H. L. EASON, C.M.G., has been elected a Fellow of University College, London.

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Appointment

Mr. ROBERT BUXTON has been appointed Hon. Ophthalmic Surgeon to the Weston-super-Mare General Hospital.

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Royal London Ophthalmic (Moorfields Eye) Hospital

THE annual dinner of the Royal London Ophthalmic Hospital took place on Thursday, March 10, 1938, at the Langham Hotel. Mr. A. C. Hudson, Consulting Surgeon to the Hospital, presided. The Toast of the Hospital and School was proposed by the Chairman. Mr. Theodore W. Luling, Chairman of the Hospital, and Mr. Charles Goulden, the Dean of the School, replied. The health of the guests was proposed by Mr. R. Affleck Greeves, and Major-General W. P. Macarthur, Director-General of the Army Medical Service, replied. Mr. P. G. Doyne proposed the health of the Chairman.

In responding to the health of the School the Dean incorporated his report. He remarked on the flourishing state of the School, in that the entries were even larger than in 1936. 114 new students had been admitted between October, 1936, and October, 1937; 77 old students had continued their attendance. The School also provided instruction for students from the Post-Graduate Medical College, these being in addition to the numbers given above.

The examination results had been satisfactory. Of 98 entries for the first part of the D.O.M.S., of 48 successes 40 were Moorfields students; at the final examination, of 73 entries and 53 successes 43 came from Moorfields. At the D.O. Oxford there were 18 entries, and of the 9 who were successful 8 were students of the Hospital.

Among honours that has fallen to old students during the past year were the following:—Sir Stewart Duke-Elder had been appointed Surgeon-Oculist to His Majesty the King; Sir William Lister had been appointed Consulting Surgeon-Oculist to His Majesty the King; Mr. Juler has been appointed Surgeon-Oculist to the Household of His Majesty the King; Mr. Goulden had been appointed Surgeon-Oculist to the Household of Queen Mary; Sir John Parsons had been elected President to the Royal Society of Medicine; Dr. Gordon Holmes had been elected President of the

Ophthalmological Society; Mr. Leslie Paton had received the Mackenzie Medal.

The following appointments have been gained by old students:—Mr. Foster Moore has retired from his position as Surgeon to the Hospital and has been elected a Consulting Surgeon; he has also been elected Consulting Ophthalmic Surgeon to St. Bartholomew's Hospital. Mr. Scott has been elected Ophthalmic Surgeon to St. Bartholomew's Hospital, and Mr. Stallard Assistant Ophthalmic Surgeon. Mr. E. F. King has been elected Assistant Surgeon to the Hospital as well as Assistant Ophthalmic Surgeon to Westminster Hospital. Both Dr. Russell Brain and Dr. Purvis Martin have resigned their position as Physicians, and Dr. Denis Brinton of St. Mary's and the National Hospital, has been elected Physician, and Dr. Meadows Assistant Physician; these gentlemen are continuing the lectures on, and instructions in, medical ophthalmology. Mr. A. B. Goldsmith has been appointed Assistant Surgeon to the Central London Ophthalmic Hospital, and Ophthalmic Surgeon to the Paddington Green Children's Hospital. Mr. Skeoch has been appointed Assistant Surgeon to the Western Ophthalmic Hospital. Mr. Arthur Lister has been appointed Ophthalmic First Assistant to the London Hospital, and Ophthalmic Surgeon to the Hostel of St. Luke.

The Dean again drew attention to the urgent need of ophthalmology being placed in its proper position in relation to the other branches of medicine by the foundation of a Professorship and a suitable team of helpers. Until this was done it was impossible to achieve more in the direction of teaching and training.

The attendance was 86.

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Oxford Ophthalmological Congress

THE 27th Annual Meeting will be held from July 6 to 9, 1938. The discussion will be on July 7, on "Ocular Palsies, their aetiology, diagnosis and treatment" and will be opened by Dr. Bernard Chavasse and a Neurologist.

The Doyne Memorial Lecture will be given by Prof. von Szily. Its title is "The contribution of pathological examinations to the elucidation of the problems of cataract—morphological findings and changes in the chemistry of the lens in different cases of cataract, their primary rôle, temporal sequence and local combination."

Papers have also been promised by Prof. Lauber (Warsaw). Dr. Traquair, Dr. Bernard Samuels, Dr. van Heuven, and Dr. Czukrasz Ida (Debrecca).

The annual dinner will be held on Thursday, July 7.

In the Scientific Museum will be held demonstrations of ophthalmological interest. Microscopes will be provided on request. The

Master is Dr. C. G. Russ Wood and the Hon. Secretary Dr. F. A. Anderson.

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North of England Ophthalmological Society.

AT the Annual Meeting of the North of England Ophthalmological Society held on April 1, 1938, the following members were elected to the Council for the year 1938-39:—President, Mr. W. M. Muirhead; Vice-President, Mr. H. Haward Bywater; Treasurer, Mr. Walter H. Kiep; Members of Council, Mr. T. Ashdown Carr and Mr. George Black; Secretary, Mr. Percival J. Hay.

FUTURE ARRANGEMENTS

1938

May 27.—Midland Ophthalmological Society, at Cheltenham Eye Hospital.

June 10.—Section of Ophthalmology, Royal Society of Medicine (Annual Meeting).

July 7-9.—Oxford Ophthalmological Congress, at Oxford.

October 7—Midland Ophthalmological Society, at Birmingham and Midland Eye Hospital (Annual Meeting).

CONTEMPORARY OPHTHALMIC LITERATURE

American Journal of Ophthalmology. *March, 1938.*

RONES. Senile changes and degenerations of the human eye.

VAIL. Posterior sclerectomy as a form of treatment in subchoroidal expulsive haemorrhage.

WATSON and WUESTER. General considerations in the radiation treatment of skin cancer in the region of the eye.

JACKSON. Causes of senile cataract.

HARBERT. An effective operation for entropion in trachoma.

HAESSLER. Relationship of heterophoria to divergence and convergence, based on clinical measurements.

RAMBO. The surgical treatment of trachoma.

NEWMAN. Ocular signs of intracranial disease in children and juveniles.

NEHER. Aniridia congenita, irideremia.

Annales d'Oculistique. *January, 1938.*

ROCHON-DUVIGNEAUD. A hundred years of Franco-Belgian ophthalmology. (1838-1938.)

PARINAUD. Paralysis of associated movements of the eyes.

LAGRANGE. Combined iridectomy and sclerectomy in the treatment of chronic glaucoma. New procedures for the establishment of a filtering cicatrix.

NUEL. Sight.

REDSLOB. Laquer's discovery of the anti-glaucomatous action of eserine.

MORAX. Gonococcal infection.

February, 1938.

BAILLIART. Retinal oedema.
DOR. The prescription of prisms.
FRYDMAN. The treatment and the development of two cases of Gröenblad and Strandberg's syndrome (angioid streaks and pseudo-xanthoma elasticum).
GOZBERK. A case of staphylococcal septicaemia following a suppurating Meibomianitis.

March, 1938.

ALAJOUANINE and MORAZ. The tonic pupil and its relation to Adie's syndrome.
FROGÉ, POURSINES and CHINIARA. Considerations on the limbal forms of vernal conjunctivitis.
DANIELEWSKY and KAMINSKY. Allergic reaction of trachoma.
JOURDAN. Treatment of trachoma by local auto-sero-therapy.

Archives d'Ophtalmologie. *January, 1938.*

KELLER. Contribution to the study of trachoma in Indo-China.
FUCHS. The importance and the aetiology of holes in retinal detachment.

February, 1938.

ARGAUD and BERGES. Anatomico-pathological considerations on conjunctival xerosis.
FISCHER. The presence of vitamin B.1. in the lens and its significance.
BUSACCA. Observations on the culture of trachomatous tissue.
TROMEUR. Foreign body tolerated for 29 years.
CERISE and OFFRET. Late development of an orbital graft.

March, 1938.

WEEKERS. Importance of perforations of the ocular tunics in the operative technique of retinal detachment. Participation of the conjunctivo-episcleral tissue in the cure.
CHARAMIS. Blepharoplasty, dermo-muscular pedicles.
BOGOSLOVSKI. Alterations in the critical frequency of flickers of light of a reflex conditioned character.

April, 1938.

STREIFF and ZELTNER. The Laurence-Moon-Bardet-Biedl syndrome.

Zeitschrift für Augenheilkunde. *February, 1938.*

MEISNER. The treatment of kerato-conjunctivitis sicca.
SCHUTZBACH. A case of severe malformation, especially of the cranium and of the facial skeleton.
PURTSCHER. The aetiology of "spontaneous" choroidal detachment and of "serous Tenonitis."
FISCHER. Malformation of the lacrymal passages and their recovery of form.

March, 1938.

HOEHNE. Reflected image with the object of promoting improvement of a baby's visual acuity.
VON BÖCK and SCHLAGENHAUFF. The occurrence of lacrymal gland cysts.
FAZAKAS. The significance of fungi in ophthalmology.

Klinische Monatsbl¨tter für Augenheilkunde. *February, 1938.*

SATTLER. Experience with contact glasses.
BUNGE and HEYN. Dark adaptation of poorly pigmented and albinotic eyes.
MIKLOS. A case of voluntary nystagmus.

KOKOTT. Stereoscopic photokeratoscopy. Observations on a simple mechanism to make use of the Zeiss stereo-camera for the attainment of stereoscopic photokeratoscopy

VOS. Ophthalmoscopy with red-free light.

HEINSIUS. Fundus changes in diabetics. Report on the examination of 221 diabetic patients.

PREVEC. Long observation of a case of central retinal detachment.

DERKAC. Medical treatment of senile cataract

STREBEL. Allergy and vascular hypotonus. The coincidence of allergic transmission. Treatment of hay-fever at its most severe stage.

Archivio di Ottalmologia. *December, 1937.*

NICOLATO. Secondary glaucoma from discission of pseudo-cataract.

TOMAI. A case of traumatic perforation of the macula.

Bollettino d'Oculistica. *January, 1938.*

MOTOLESE. Dystrophy of the corneal epithelium and endothelium.

CASSUTO. Bilateral disciform keratitis.

GRANCINI. Oriel's substance "P" and vernal conjunctivitis.

RAPISARDA. An unusual case of detachment of the pars iridica retinae. (Clinical and bio-microscopical contribution).

DE CONCILIIS. The metabolism of the retina in narcosis.

Rassegna Italiana d'Ottalmologia. *November-December, 1937.*

GALLENGA. Contribution to the knowledge of ocular amoebiasis: thrombophlebitic retinal haemorrhage.

CECCHETTO. A case of spring catarrh with deposits of haemosiderin in the tarsal conjunctiva of the upper eyelid.

ANGIUS. Scleral cysts of traumatic origin.

RAPISARDA. Bacteriological research on the presence of infra-microbic bodies in trachomatous conjunctivitis.

CARDELLO. Hypertensive irido-cyclitis.

DUC. Uncommon orbito-palpebral localization in Kahler-Bozzolo's disease and in acute myeloid leukaemia.

Revista Cubana de Oto-Neuro-Oftalmiatria.

July-August, 1937.

CASTELLANOS. Contribution to the anatomico-pathological study of xerophthalmia.

MENDOZA. Ocular work in diffuse light.

September-October, 1937.

MONTALVAN. Orthoptic treatment of concomitant strabismus.

ABRIL and DE CASTRO. Protuberant syndrome of complex glio-epithelioma.

Revista Oto-Neuro-Oftalmologica. *November-December, 1937.*

BELLONI. Traumatic intracanalar lesions of the optic nerve from fracture through the optic canal.

RAVERDINO. Idiosyncrasy from quinine and malaria therapy in tabetic affections.

COJAZZI. Experimental researches on vestibulo-vegetative reflexes.

RUBINO. Contribution to the study of optico-chiasmal arachnoiditis.